ADVERTISING PAGES REMOVED

JULY 1930

WORLD'S WORK

RUSSELL DOUBLEDAY *EDITOR*
LAWRENCE M. CONANT ALAN C. COLLINS
ASSOCIATE EDITORS

THE MARCH OF EVENTS

OUTWARDLY one Fourth of July is much like any other. Each year the flags fly and the bands play and from a thousand platforms warmed with the bright glare of a midsummer sun the orators of the day review the forward march of the American Republic.

If these orators were to confine themselves this year to a summary of what has happened since the last Fourth of July was celebrated, what event would they single out as most significant and of most real importance?

Probably they would have to divide their emphasis between two points:

At home, a stock-market panic which deflated paper fortunes and for a time retarded business but which demonstrated nonetheless the resiliency and the recuperative power of American trade and industry.

Abroad, the negotiation of a treaty which for the first time in history puts an effective limit on the fleets of the three chief naval powers of the world.

We shall build more ships, but no more ships in competition with our neighbors on the rims of the Atlantic and Pacific Oceans.

Fourth of July—Old Style and New

MERELY in the manner in which the American people celebrate this holiday there is one striking difference between the old and new.

Ten years ago or twenty years ago, we should have opened our newspapers on the morning after the Fourth of July and read dishearteningly long lists of the casualties resulting from powder burns and fireworks explosions. Such lists will appear again this year. But unless all signs fail they will be short lists, not for a moment to be compared with the harvest of the old-time celebration. For the progress toward a sane Fourth has gained ground steadily year by year.

Twenty-five years ago, in 1905, Fourth of July casualties amounted to 182 killed outright and 4,994 wounded—figures which read like the results of an engagement in a war.

But by 1910, deaths had been reduced to 131 and injuries proportionately. By 1915 the death list had fallen below 40. Two years ago it was 11. Last year it was 7.

Here is one reform which has succeeded brilliantly, partly because it had sound common sense behind it and partly because it had something which certain

other reforms have lacked: namely, an attractive alternative which it could offer as a substitute for the supposed pleasures which it banned.

Practical experience has demonstrated to the American people that there is more satisfaction in a motor ride or a baseball game or a double round of golf than in the old-fashioned celebration.

We have learned, meantime, that there are better ways of showing patriotism than by toying with explosives.

Unrest in the British Empire

INDIA is not the only quarter of the far-flung British Empire which is now giving the government of England good reason for concern. Egypt has raised a serious problem at the Suez Canal. In South Africa there is a Boer minority which is once more discussing independence. Mesopotamia has asked for the termination of the British mandate under which it has been governed since the war. Even the small island of Cyprus has stirred from its centuries of slumber and sent a committee to London to file a petition for home rule.

Not in our own generation has the huge frame of the British Empire creaked so audibly in so many places simultaneously. Dissatisfaction exists. It is impossible to conceal the fact. But it is important to note, however, that no signs of dissatisfaction are evident in the great commonwealths—Canada, Australia, and New Zealand—which form the backbone of the empire. England is faced with trouble only where a subject race now challenges the supremacy of the white man.

This is one result of nationalism, and nationalism has become a driving force in every quarter of the world. China is in the throes of a young nationalist movement which makes racial patriotism its watchword. So is Turkey. So is Central Europe. We catch the echo of this nationalism nearer home, in Haiti, the Virgin Islands, and the Philippines.

Spread across every sea and every continent, it is inevitable that the British Empire should catch the full sweep of this insurgent force which is now at work throughout the world. It is not decadence that is troubling the British Empire but a sudden, sharp attack of growing pains.

A Vacation for the President

PRESIDENT HOOVER will cross the Continent shortly, visiting several of the national parks in the West and resting briefly at his home in Palo Alto, California. The trip, intended to give the President relief from almost continuous political warfare at the seat of the government, has been a subject for the widest comment. Republican leaders have urged Mr. Hoover to make numerous addresses during his journey, and communities great and small, from the Atlantic to the Pacific, have showered him with invitation after invitation.

Keeping political engagements and attending civic meetings will be work, not recreation. Mr. Hoover needs the latter. No President, however, can conduct himself during a vacation as can a private individual. There are obligations that he must consider. He must "show himself," at least occasionally. It is a demand that the country makes.

But the country, in making the demand, should be considerate. It should remember that any President, to preserve his health, must have rest. In the case of Mr. Hoover, it should recall that the demands upon him in the past sixteen months have been extraordinary. He has labored under exceptionally trying conditions, because of the hostility of the Senate, because of business conditions, and because of the importance and great variety of the problems with which he has had to deal.

The country should bear in mind, furthermore, that the President has more than half of his term still to serve—by far the most important half, not to himself but to the nation. He must rehabilitate himself physically, if he is to be equal to the demands that are to be made upon him.

His desire is not to meet politicians but to get away from the politically inclined. The wilderness wonderlands of America offer him partial seclusion. They are his objectives. In Glacier, Yellowstone, or Rocky Mountain he can enjoy the beauties of nature as he goes forth with rod and reel to whip a tumbling stream for the elusive trout. While so engaged, he can forget momentarily the cares of state that burden him.

He has said that fishing is the only activity in which he can engage that is devoid of politics. Let him fish to his heart's content. Permit him for once to forget politics. The more completely he separates himself from politics during the few weeks he will be away from the national capital, the better qualified he will be to discharge the duties of his office upon his return to Washington. The more complete his rest, the better it will be for the country.

Our Changing South

WHEN future historians write the story of the times in which we live they will note one major economic movement as definite and perhaps as important as the trek of the covered wagons west in the first decades of the 1880's or the rush to the Coast for gold in '49.

This movement is the swift march of industrialism through the South, bringing thousands of new mills and factories into states which were once almost exclusively agricultural. How rapidly the change is taking place may be gauged from figures published recently in Washington. In six years' time the value of goods manufactured in the ten states south of the Potomac and Ohio and east of the Mississippi has increased from $3,384,000,000 to $5,277,000,000. This increase of nearly 60 per cent took place while the value of manufactured goods in the rest of the country was increasing only 42 per cent.

A new industrialism has brought the South new opportunities, new problems, and a new point of view. The opportunities are inherent in the basis laid for a more widely shared prosperity. The problems are obvious in the first serious labor troubles in the South and the demand for revision of legislative codes,

which naturally lag behind the advances made in more experienced states. The new point of view is expressed in the changed attitude of the South toward such political questions as the tariff.

One of the historic shifts which quietly change the character of a nation is now in progress. It seems certain to be of great importance and great value to the country as a whole. For with a prosperous industrialism established in the South, we shall have a more even balance of economic interests throughout the nation, a better understanding of problems mutually shared, and less risk of those sectional disputes and sectional misunderstandings which spring from economic motives.

The New British Ambassador

NO MAN in the British Foreign Service has had wider experience and a more even, methodical advance toward large responsibilities than Sir Ronald Lindsay, who has succeeded Sir Esme Howard as British ambassador to the United States.

At twenty-one Sir Ronald received his first diplomatic post at the Russian Court in Petrograd. From there he went to Teheran; then to Washington as an undersecretary when James Bryce was British ambassador; then to The Hague, to Cairo, back to Washington as chargé d'affaires, to Paris as minister plenipotentiary; then to Constantinople, Berlin, London as undersecretary of the Foreign Office, and finally to the United States again as ambassador.

This is the third time in Sir Ronald's career that his orbit has touched Washington. He has friendships here which have lasted many years. He is still more closely tied to the United States by marriage: Lady Lindsay being the former Elizabeth Hoyt, daughter of the late Colgate Hoyt, head of the banking house of Colgate & Company in New York.

The choice of this experienced diplomat as ambassador to the United States throws an interesting light on the methods of British foreign policy. Sir Ronald is not a Labor party man. He is not a commoner like Ramsay MacDonald or the head of the Foreign Office, Arthur Henderson. He is, on the contrary, the scion of one of the noblest families in Great Britain, son of the twenty-sixth Earl of Crawford, the premier earl of Scotland.

On the surface it might seem that there is no bond of common interest between this ambassador and the Labor party leaders he now serves. That is because we do not have in this country the same traditions in our foreign service and the same theory of diplomacy as nonpartisan.

In this country a Labor government coming into power would promptly feel called upon to send Labor party ambassadors abroad, as a Republican government feels called upon to substitute Republicans for Democrats, and vice versa. The advisability of taking similar action in the present case was urged upon Mr. MacDonald by some of his advisers, who thought that England under a Labor government should certainly be represented in this country by a prominent trade-unionist.

Mr. MacDonald is said to have dismissed this argument on the ground that he wished to send to Washington neither a trade-unionist nor an anti-trade-unionist, but simply the most experienced and capable diplomat in the whole British Foreign Service. Sir Ronald Lindsay comes to us with this recommendation. It is a pleasure to help bid him welcome.

Ohio's Prison Holocaust

IN THE STORY of such a calamity as overtook the Ohio Penitentiary at Columbus, the most disheartening fact is that the state legislature had ample warning that a catastrophe might occur and yet did nothing to avert it. There can be no reasonable doubt on this point. Even in 1928 the National Society of Penal Information reported overcrowding in the Ohio Penitentiary to be worse than in any other large prison in the country.

Nor did criticism of conditions come solely from outsiders. The warden of the penitentiary in question has testified that for twelve years he urged successive legislatures to provide relief. The Ohio State Journal has declared: "Men in Columbus have pleaded with the legislature many times for betterment of prison plants and conditions, but their pleas fell on deaf ears."

Regardless of whether the fire was set by an incendiary, the legislature cannot dodge responsibility for the conditions which permitted this fire to become a holocaust.

It would be unfair, however, to single out the Ohio legislature for special criticism merely because Ohio has furnished the latest and one of the most frightful disasters in the history of American prisons. Other legislatures have shown similar neglect. The shocking conditions which fostered two revolts at Auburn State Prison in New York supply a case in point. Times without number, after a catastrophe has occurred, it has been shown that the legislature which controls the expenditure of public funds has had due warning from an expert source of the situation which was developing.

The answer given by the average member of a state legislature to criticism of this sort is that he has been caught in an unfortunate position. Admittedly conditions in this or that state prison or state hospital are bad. But the public is not interested in the situation. It is interested only after a tragedy has occurred, and not before. Meantime it is more interested in

having its taxes cut and in not being bothered by "problems."

All this, unhappily, is often true; but it does not free the legislatures of their responsibility. The public is large, remote, unorganized, and unacquainted with the business of state government. In such matters as providing a decent minimum of health and safety in state prisons, hospitals, and asylums, it is the business of state legislatures to give the public effective leadership which cannot be disputed.

Business and the Market

AMONG the explanations still being given of the collapse of stock-market values last October are many theories which are sharply at variance with one another. There are, in fact, almost as many explanations as there are market experts.

It is important to have these theories analyzed—the weak ones discarded and the strong ones set in proper relationship to one another. The wide influence which the stock market exerts on business needs no further demonstration. What we need now is to understand as clearly and as authoritatively as possible the events leading up to last year's debacle.

It is good news, therefore, to learn that President Hoover will appoint a commission to make a painstaking study of the whole boom and slump, in order to give the country a connected story.

Accomplishments of the Farm Board

THE Federal Farm Board has performed a real service to the nation during the year it has been in existence, all reports to the contrary notwithstanding. It has been especially helpful to the army of Western agriculturists engaged in raising wheat, but its beneficent accomplishments have extended to practically all branches of farming.

Proof of the foregoing can be offered by a single comparison. The depression of 1921 and 1922, which marked the beginning of the drive for agricultural relief that continued for almost a decade, culminating a year ago last spring in the enactment of the legislation creating the Board, resulted in a 50 per cent drop in the price of wheat. In contrast, the equally serious recession beginning last winter drove the price of the grain down only from 10 to 12 per cent.

There was no Board eight or nine years ago to help the growers by stabilizing prices. Such an organization, however, has been operating during this last crisis, buying up some thirty million or forty million bushels of wheat and preventing disaster. Much as speculators may criticize the Board, it has justified its existence, if only because of this single instance.

The help that the Board rendered the wheat farmers was beneficial to agriculturists other than wheat growers. Had it not been for the assistance given, the decline would have been reflected ever so much more than it was in the price of other products of the farm. It marks the beginning of a new era for agriculturists, with the granting of protection that has never been afforded before.

It should be emphasized that the primary object of the Board is not to deal with such an emergency as recently occurred, but rather to organize marketing systems for the farmers, making such loans to the agriculturists as may be necessary. It is in this particular that its full value will be demonstrated eventually.

The emergency arising, however, the Board gave it undivided attention. To have ignored the emergency would have been a grave mistake. Whatever other work might have been done would have been futile. The Board is deserving of praise for taking command of the situation, thereby limiting the reduction in prices and saving farmers many millions of dollars. Commendation of it for its broader activities will come as it completes the farmers' marketing organizations and as those organizations, helping producers and consumers alike, begin to function. It has nothing to apologize for on the first anniversary of its creation.

Women in Politics

IF Ruth Hanna McCormick wins the campaign which has now begun in Illinois she will be the first woman ever elected to the Senate of the United States. But whether or not she wins, it seems altogether likely that within the next few years some woman will turn this trick. For the Senate is not impregnable, and the activity of women in politics is steadily expanding.

To be sure, there has been no such triumphant march into public office as was predicted by many enthusiastic prophets when the suffrage amendment was added to the Constitution. Nevertheless, considering the handicap with which a woman candidate for public office starts, the record is by no means unimpressive. Two women have been elected governors of states. Eight women are now members of the House of Representatives. No less than 149 women are members of state legislatures, in a long list of thirty-eight states in every section of the country.

It is not merely by this counting of heads, however, that the influence of American women in politics can be realistically measured. For this test overlooks two important fields in which the political activity of women is particularly effective:

First, in the government departments in Washington, where experienced women executives are now at the head of such important offices as the United States Employees' Compensation Commission, the Children's Bureau, the Bureau of Home Economics, the Women's Bureau, and the Passport Division.

Second, in the work of the National League of Women Voters, which has created one of the most effective, most disinterested, and most genuinely nonpartisan organizations for the discussion of political problems now functioning in this country.

The Father of Waters Helps

OL' MAN RIVER, an agent of destruction as it rolls to the sea in time of floods, is proving to be an agent of employment in time of business recession, giving work to thousands of brawny laborers and keeping machinery in motion in industrial plants in many corners of the land.

Men mucking along the levees, widening and raising these walls of earth that are intended to keep the Mississippi in control for all time to come, might well be out of employment but for the flood of 1927. But they are not the only beneficiaries, not by any means.

Pipe manufacturing plants are being kept busily engaged building the giant suction tubes that pull sand and mud out of the deepened channels. Excavating machines are being built in large numbers. Railroads are hauling materials and supplies to the points of operation. Shipbuilders are making barges, dredges, and towboats for the use of the workers.

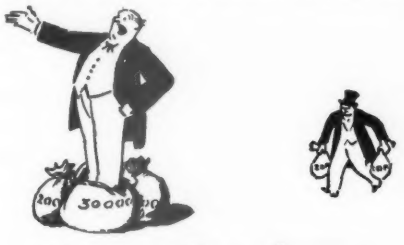
These are only examples of the employment offered by the flood control work, which will continue for some years to come, certainly long after the recent business depression is little more than a memory.

The Child Health Conference

THE White House Conference on Child Health and Protection is nearing the end of its more than a year of labor. More than five hundred leading experts in medicine, education, social service, delinquency, nutrition, and so on have been collating all the available scientific data on the problems of childhood, preparatory to reporting to a national conference to be held in Washington this fall. These reports, taken together, will present a comprehensive picture of the physical and social condition of American childhood and will offer specific recommendations of best methods of insuring normal life and development.

Not only will these facts and recommendations give a clear picture and be a guide to future action, but the Conference has so ordered its program that it has assured the coöperation of local and state governments of private philanthropic and altruistic agencies, and in many cases even of industries that supply products indispensable to childhood. The belief is that the Conference will thus initiate a nation-wide program of activities in behalf of the children, will set up acceptable new standards, and will enlist all existing agencies in sympathetic participation in a movement of national scope and common aims.

President Hoover, among the first acts of his Administration, requested Secretary Wilbur, of the Department of the Interior, to organize this undertaking, and when the Conference gathers in Washington, probably in November, he will address its opening session. It is known that the President considers the advancement of the interests of childhood to be perhaps the most important contribution that can be made to the welfare of the country, and that he attaches the greatest importance to the work of the Conference.



Campaign Expenditures

IN ITS ZEAL to investigate anything and everything which caught its restless eye, the Senate finally hit upon one question late in the session which is preëminently its own business. This is the question of campaign expenditures made by candidates for seats in Congress.

Four years ago the primary elections in the spring and the elections in the fall were made the occasion for the expenditure of more than half a million dollars in Illinois, more than three million dollars in Pennsylvania, and large sums in other states.

Inevitably the modern campaign costs more than its old-fashioned predecessor. The electorate is larger. There are more people to reach. They are harder to reach because of the distractions in our modern life and the difficulty of catching and holding public interest. Meantime such up-to-date devices as radio broadcasting, publicity, and the circularization of mailing lists have added to the cost of running a campaign for public office.

Nevertheless, with all this admitted, it must be said that a popular election is scarcely a real test of public opinion if personal wealth or party wealth enables one candidate to pour hundreds of thousands of dollars into a campaign, and the other candidate has no such funds at his disposal.

At the very least, public interest requires that all campaign expenditures shall be published well in

advance of an election and not after it is over, in order that voters may have this information before them at the polls.

By deciding early in the year to create a committee which can investigate all rumors and report all facts, the Senate has taken action which should prevent a repetition of the wild expenditures of 1926.

When Secrecy is Best

THERE can be no question but that the members of the United States Senate should be liable to their constituents at all times, but question can be raised whether confirmation of nominations in open session is in the interest of the people and the country. In theory, the open sessions are excellent, permitting residents of each state to know what their senators have said and how they have voted on each appointment, offering, moreover, a check on bad selections. Alas, the open sessions present new evils greater than ever came from the executive sessions of the past.

With the welfare of the country at stake, secrecy is preferable to slander. Furthermore, the action of a senator behind the closed doors of the Senate chamber, with his conscience as his guide, is ever so much more desirable than action dictated by organized minorities.

The nominations of Charles Evans Hughes to be Chief Justice of the Supreme Court of the United States and of John J. Parker to be an associate justice of that highest tribunal are cases in point. Mr. Justice Hughes was subjected to a wholly unwarranted attack that he survived by a narrow margin; Judge Parker to an equally unwarranted attack that subjected him to defeat by a single vote.

It is noteworthy that neither Mr. Justice Hughes nor Judge Parker could defend himself against the propaganda that was circulated. Each was the victim of a one-sided campaign. The President was equally helpless, for had he surrendered to the temptation to fight the minorities opposing his nominees he would have laid himself open to the charge of seeking to influence the Senate, rather than seeking "its advice and consent."

Better—far better—the direct election of justices, permitting them to campaign in their own behalf and meet assault with assault, than this newest of legislative innovations.

It may be argued that a good appointee has nothing to fear from the open sessions, but whoever makes such an argument does not know politics. Judge Parker had the widest support in his profession and his ability stood the test of investigation, yet he failed of confirmation.

No less than fifteen senators who voted against him on the roll call said at one time or another during the controversy that he would make a good justice. They wanted to see him elevated to the Supreme Court, but they did not want the minorities battling against him to turn their fire on them. They sacrificed him to save themselves, being too anxious to be returned to the Senate at the expiration of their respective terms to antagonize his opponents.

The fight made against Judge Parker may be only an incident, but the contest waged against Mr. Justice Hughes is a solemn warning. It has been difficult enough in the past for a President to secure the services of the best qualified men for the highest of appointive positions. If the open sessions are continued, it will be an impossibility for the President to induce outstanding men to accept appointments.

The needs of good government dictate the advisability of immediate return to the executive sessions, especially when, down through the years, a vote was never taken behind closed doors without having the result of the balloting known in detail within fifteen minutes after it had been completed.

Two Wet Leaders

DURING recent weeks two men whose names were not widely known throughout the country have received sudden prominence as the result of testimony given on the witness stand in Washington. These men are Capt. William H. Stayton and Henry H. Curran, active leaders of the wets, chairman and president, respectively, of the Association Against the Prohibition Amendment, and interesting figures both.

Captain Stayton is a man of sixty-nine. Born in the small town of Smyrna, Del., in 1861, graduated from the United States Naval Academy at Annapolis in 1881, for eighteen years he was in the active service of his country, commanding various warships both in times of peace and during the Spanish-American War. He resigned from the Navy in 1898 and for some years practiced as an admiralty lawyer, gradually shifting from law into the management of steamship companies. He is at the present time the active head of an uncommonly successful line, the Baltimore Steamship Company, and a director in various other lines. Smyrna, Del., is still his home. He still retains his interest in naval affairs; still remains a rugged, energetic figure; still practices in regard to alcoholic liquor the complete abstinence of the teetotaler.

Serving with him at the head of this organization which now seeks the repeal of the Eighteenth Amendment is a younger man, Henry H. Curran, of New York. A graduate of Yale University and of the New York Law School, Mr. Curran has been a member of the Board of Aldermen in New York, a major in the 77th Division during the war in France, and president of the Borough of Manhattan in 1919 and 1920. In 1921 the Republican party nominated him as its candidate for mayor of New York City. Tammany defeated him. For two years he returned to private law practice. In 1923 he was appointed United States Commissioner of Immigration at Ellis Island.

These are the two men who now direct the destinies of the Association Against the Prohibition Amendment. It is possible to disagree flatly and completely

with the purpose they are seeking to accomplish. It is possible to believe that they have overestimated the strength of the wet sentiment of the country. But it is not possible to challenge their good faith or to suspect their patriotism, in view of their service in two wars and the high esteem in which they are held in the communities in which they live.

The Captain of the Drys

AT THE HEAD of the forces opposed to the wets and in favor of prohibition there are many men who divide the responsibilities of leadership. The one man, perhaps, upon whom the largest burden rests, because he is at the head of the most militant organization in the field, is Francis Scott McBride.

Like so many other leaders of the cause of prohibition, Dr. McBride is a native of Ohio—born in Carroll County of that state in 1872, educated at the small Ohio college of Muskingum, and trained in the Ohio traditions which developed the founders and the first great captains of the Anti-Saloon League of America.

Graduating from Muskingum in 1898 and from Pittsburgh Theological Seminary in 1901, Dr. McBride found his first pastorate in the Presbyterian Church of the small mining town of Kittanning, Pa., where he remained until 1909. In the latter year he went to Monmouth, Ill., becoming superintendent of the Anti-Saloon League in that state in 1912 and general superintendent of the national organization in 1924. Wayne B. Wheeler was at that time a more prominent leader in the public's eye. Since Mr. Wheeler's death, however, Dr. McBride has accepted larger responsibilities and come inevitably into the foreground of the prohibition movement.

Unlike Mr. Wheeler, who was a small bundle of steel nerves, Dr. McBride is a hulking man, towering, broad-shouldered, slow-moving, and courageous—a steady and resourceful leader.

Give him an hour's walk with Captain Stayton of the wets, on the pleasant country roads which lead through Carroll County or up from Delaware Bay toward Smyrna, and these two men who are both plain-spoken might find much on which they could agree: in politics, in business, and in literature. Meeting as strangers they might walk far, in fact, and find each other reasonable men, unless one or the other happened to ask, "And what do you think of prohibition?"

A Shortage of Naval Officers

THE NAVY is operating with short-handed officer complements, even for peacetime conditions, due to the limitations placed on the number of line officers who may be in active service and the number of appointees to the Naval Academy at Annapolis. Increases in both particulars must be made, if our first line of defense is to be efficient.

Under the existing law, each member of Congress has only four appointments annually to the great training school for American naval officers. Moreover, the number of line officers in active service is restricted to four per cent of the total authorized strength of the combatant forces. To make for an adequate distribution, each senator and congressman should be given an additional appointment to Annapolis and the limit on the number of officers should be increased from four to six per cent.

The ratios were fixed many years ago and under conditions entirely different from those of to-day. Aviation was in an experimental stage then, and cruiser construction, such as has been inaugurated recently, was not foreseen.

Since 1923 the officer personnel assigned to aviation has increased from 456 to 715, and the number of enlisted men from 4,247 to 10,771. This increase has been effected in the face of a reduction of 1,500 in the total enlisted strength of the Navy, thus bringing about a reduction of 8,000 in the personnel available to man the units of the surface Navy. This method of supplying the personnel needs of aviation at the expense of other branches must be abandoned, if the efficiency of the Navy is not to be undermined.

Bills are pending in Congress to meet the needs of the service. An outstanding reason why the measures should be enacted is that naval officers cannot be made overnight. The Army can turn to civilian pursuits for qualified officers in an emergency, but long years of technical training and practical experience are required to make a naval officer. It is the part of wisdom for the country to make full use of its plant and facilities at Annapolis. Congress should not permit the year to pass without enacting the necessary legislation.

The Five-Day Week

TEN years ago the five-day week was an idea on the half-shell. To-day it is the accepted schedule for 350,000 union workmen in the building trades, 200,000 nonunion workmen in the automobile industry, approximately 400,000 workmen in miscellaneous trades, especially the garment trades, and, during the summer months, some 500,000 employees of business offices and shops.

How well has the short week worked in practice?

When the National Industrial Conference Board announced the results of a survey made in 1928 it reported that 30 out of 94 companies showed a loss in output, 18 showed a gain, and 46 no change.

These figures show a slight preponderance on the side of a decrease in production, but the margin is not large enough to be significant, nor have enough factories reported figures to make the test decisive.

For American industry as a whole, the short week is still an experiment—plainly of importance, with much to commend it but with certain doubts to be overcome and with the point of view of individual employers varying meantime in keeping with the results of their own first-hand experience.

GETTING THE BREAKS

How broken transatlantic cables are grappled and spliced in midocean, despite earthquake and storm

By
BURT M. McCONNELL

A section of a modern submarine cable. The conductor is of solid copper, surrounded by copper strips wound spirally. Next comes a thin ribbon of nickel-iron alloy, called permalloy, which is the latest improvement in cable making. Gutta percha is the best insulator and is placed next the permalloy. Then there is a filler of cutched jute which acts as a cushion for the heavy armor of sheathing wires, which is in turn protected by a layer of tarred cotton tape and two layers of tarred jute.

AT EXACTLY 3:32:30 P.M. on November eighteenth last, the New York operator of the Commercial Cable Company's transatlantic cable felt the wire go dead; he had "lost" the London station. His duty, under the circumstances, was to notify the supervisor, who would in turn pass along the information to the chief electrician; a purely routine matter.

This was no new experience; it had happened before, and it would happen again—whenever the Storm King whipped up the gray-green waves of the Atlantic, or "growlers" from the ice fields grounded off Newfoundland, or a rumrunner dragged her anchor across the black thread lying on the ocean floor off New York, or a clumsy trawler hooked a similar copper strand off the southerly tip of Ireland. Cable breaks were all in the day's work.

But this, it appeared, was no ordinary break; it was found to have affected Western Union, Imperial, and French cables, too. Of the twenty-two undersea channels of communication between the two hemispheres, twelve were wiped out in the twinkling of an eye!

Here was a situation absolutely without precedent. The zone of disturbance, as fixed by the electrical tests, was inside a hundred-mile circle just south of

Captain Livingston, commander of the John W. Mackay, one of the largest cable ships in the world, sitting on the grapnel rope and waiting for the "feel" of the line to tell him the cable has been hooked. This rope is let down thousands of feet to the ocean bed, where lie the broken lengths. These pictures were taken during bits of sunshine.

Newfoundland. No ship had reported a storm; the barometer had manifested no alarming symptoms; Greenland's icebergs had not yet begun their southerly drift; no fleet of trawlers would be likely to break a dozen cables at virtually the same instant. The only other possibility was an earthquake—and Newfoundland was out of the earthquake zone.

Until that November day, Newfoundland *was* out of the earthquake zone; but it then was shaken by the first tremor in its history. And for the first time in history an earthquake had shattered the communication nerves of the North Atlantic.

Here was an emergency calling for the best the cable-repair ships had to offer. For a cable, to pay dividends, must be kept at work twenty-four hours a day. Wireless messages were sent to all eight such vessels between the Panama Canal and the British Isles.

One was chartered in London at approximately $2,500 a day. Another, built and equipped for cable-repair work in southern waters, arrived in Halifax with her West Indian crew during one of the coldest weeks of the entire winter. With the mercury hovering just above zero, and with no heating system in the vessel, the Negroes could not endure the cold, foggy, penetrating winds that blow off the Grand Banks and finally had to be shipped back to Jamaica.

Weeks of hazardous work followed; there were no Christmas celebrations on shore for the grim-visaged skippers and the hundreds of hardy seamen. Weighted with ice, buffeted by gales, shut in by fog, and blinded by snowstorms, the cable-repair vessels stuck to their allotted task until compelled to return to Halifax for fresh water, fuel, and provisions.

They discovered indications of a tremendous upheaval—cable buried for miles at a stretch, and dark-brown clay and pebbles on the bottom, instead of black mud. Three times the Cambria, one of the repair ships, hooked her cable at a depth of almost a mile, and each time the cable broke when subjected to a strain sufficient to pull it out of the mud and clay.

Off to Make Repairs

My first request for permission to go on a cable-grappling expedition met with a flat refusal; likewise the second. No writer had ever been allowed to set out on such a voyage; it was too dangerous. He might fall overboard, or break a leg, or get washed into the scuppers, or contract pneumonia. Very well, I could ship as a member of the crew—at twenty-five cents a month.

Within twenty-four hours I was en route from New York to Halifax. All was bustle and confusion at the Commercial Cable Company dock. The John W. Mackay lay alongside the wharf. She looked like an ocean-going yacht, only about three times as big. Painted a battleship gray, with white superstructure and brass and mahogany fittings, she is one of the

Lashing one of the big cable buoys to the shrouds.

trimmest, as well as the largest, of the cable-repair ships. Captain Livingston's rivals in the cable-fishing business also give one the impression that she is the luckiest. Well, perhaps she is. At any rate, the skipper, like the Mounted, always "gets" his cable.

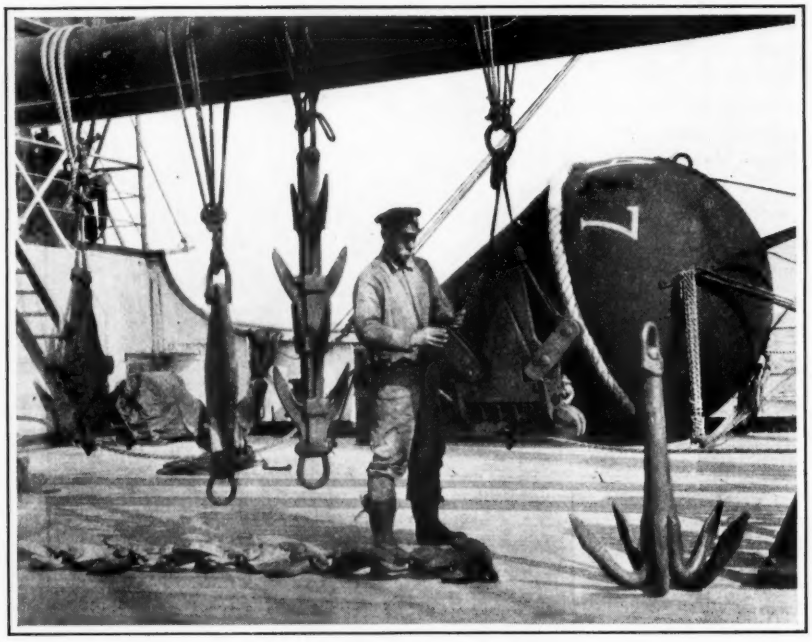
The captain's welcome, much to my surprise and gratification, was cordial and sincere. My quarters were as comfortable as those of a modern ocean liner. The coöperation freely given by everybody, from the captain to my room steward, was a revelation.

The dining salon of a cable ship is exactly like that of a liner, except that it is smaller. The smoking room, where chess, checkers, and bridge tournaments are held in off hours, has its piano and its phonograph.

The crew consists mainly of fishermen from Nova Scotia and Newfoundland, all adept at handling a small boat in a rough sea. And no small amount of cable-repair work is done in small boats. Whenever a cable end is picked up, and tests show that it is unbroken toward land, a buoy is attached to the cable and anchored, while the ship goes off to find the opposite end.

Below decks, the John W. Mackay is a bewildering array of cable winches and almost unfathomable steel "tanks," about thirty-four feet in diameter, in which hundreds of miles of cable and grappling rope can be coiled. Even if all the tanks are only half filled,

Have you ever tried to recover some small object lost in the waters of a shallow pond? A short time ago a mighty submarine earthquake severed our Atlantic cables. Breaks were many, and some were eighty miles apart. Every minute, until repairs were made, meant thousands of dollars lost. How was the seemingly impossible job of finding and patching the loose ends accomplished? Mr. McConnell sailed on a cable ship to get this unusual story for World's Work.



Himmelman, cable foreman of the John W. Mackay, with some of his favorite hooks. The flatfish type, second from the left, he uses most. The hook used must vary with the type of bottom—sandy, muddy, or rocky. A sudden stress on the grapnel rope, which passes through a dynamometer, tells when the grapnel has hooked a cable—or another obstacle.

the ship swings and rolls like a giant pendulum, even in a comparatively smooth sea.

On the main deck are the officers' quarters, electrician's testing room, wireless room, purser's office, and so forth. The crew, including the "hydrographer" (myself), number 91 souls The ship's maintenance cost is not far from a yearly average of $4,500 a week.

The John W. Mackay was in the Bay of Fundy when the earthquake occurred. Within ten minutes a wireless message was on its way from the New York office to the skipper:

CAPT LIVINGSTON
SEVERAL BREAKS TRANSATLANTIC CABLES CAUSED BY TODAYS EARTHQUAKE STOP RETURN IMMEDIATELY HALIFAX FOR MONTHS FUEL STORES AND FURTHER INSTRUCTIONS
POWELL VICE PRES

This was Captain Livingston's first news of the quake. With characteristic dispatch he replied:

PROCEEDING HALIFAX FULL SPEED
LIVINGSTON

The first snowstorm of the season was in progress, and it was followed that night by a heavy rainfall and a 36-mile gale. High tides were reported all along the south coast of Nova Scotia. In Washington, New York, Cambridge, Ottawa, and Halifax, seismologists were plotting the boundaries of the tremor and arriving at a conclusion about the epicenter.

Captain Livingston arrived in Halifax that night, and left the following day. There was no sleep for him, his officers, engineers, or crew; there was too much to be done. Meanwhile, galvanometer tests had located the breaks in practically every cable line; they were all in a submarine trough whose westerly rim formed the Continental Shelf.

The epicenter seemed to be the apex of a triangle. The breaks—several in each cable—occurred on parallel lines running southwest from the epicenter to a point below the New York–Azores cable, or southeast from a point approximately a hundred miles southeast of the epicenter. Practically all the damage to cables, with the exception of that suffered by the New York–Azores lines, 370 miles to the southeastward, was done within a radius of a hundred miles of the epicenter.

In the 24-day voyage in search of broken copper strands, there was just one clear day—December thirteenth. Buffeted by mountainous seas and shrieking, icy gales, the John W. Mackay and seven other cable-repair ships struggled, far out on the Atlantic, against tremendous odds. The cables they

The boatswain wraps the cable to prevent chafing while the splice is made. If there is danger of a cable parting while repair work is under way, or while anchored to a buoy, a new length is spliced on and paid out till all the cable suspended off the bottom is new. In very deep water, cable stress often amounts to two tons.

The two wireless operators and Carey, chief electrician, right. These are all-important posts on a cable ship; the "sparks" must always be in touch with the shore, and the electrician makes careful tests every time the cable is brought to the surface.

were grappling for were mere threads a mile and three quarters beneath the surface, where the pressure of the gray-green water is 4,350 pounds to the square inch.

Nevertheless, Captain Livingston, after being on the ground only two days, managed to hook one of the main cables. Later I asked one of the officers how he did it.

"Well," he replied, "most of the skippers engaged in cable fishing use good, common horse sense. The captain goes them one better; he uses good, common seahorse sense."

How does he find a mere bit of wire, covered with mud and clay, ten thousand feet beneath the surface? And, having found it, repair it in the face of so many difficulties? The ship that laid the cable in the first place, of course, had a chart; but sometimes ships cruised by dead reckoning. Captain Livingston has found that a cable may be five or six miles "out," according to the chart.

Deep-Sea Fishing

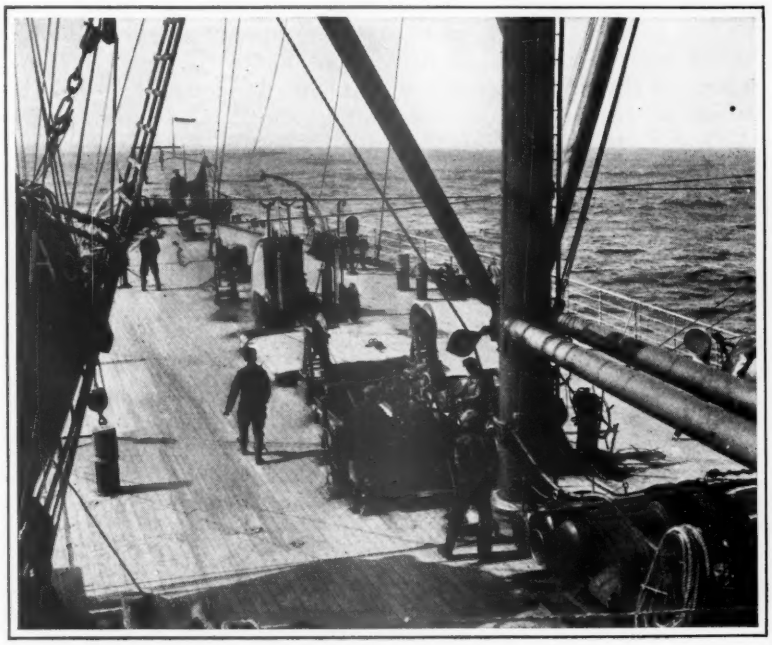
Suppose, however, that the chart is right; there still remains the job of locating the distance of the break from shore. Here is where the galvanometer comes in. Since electrical resistance is in direct proportion to the length of the conductor (copper core), and the resistance (or amount of electricity each mile of cable will hold) is determined before the cable is laid, the location of the break to within a couple of miles is usually possible.

Captain Livingston proceeded as if he had never heard of the earthquake. If the bottom had fallen out of the Atlantic, as some skippers intimated, he would follow the thin copper thread to the very shores of Newfoundland, if need be. His vessel was the first to reach the scene of the disturbance and the first to raise a cable from the bottom of the sea.

Captain Livingston's tactics depend mainly on the weather, or what he thinks the weather will be by the time he hooks the cable and brings it to the surface—sometimes a matter of eight hours. He must also consider the depth, and the character of the bottom. Arriving at the spot where, according to galvanometer tests, a break has occurred, he checks the ship's position, as fixed by the navigating officer, with his own sextant.

The position is then verified by two separate soundings, one with the time-honored lead and the other with the fathometer. This sonic depth finder is a wireless set that sends sound impulses into the water so that they strike the bottom and are caught on the rebound, as it were. The depth is measured by the time it takes for the echo to return to the instrument.

With his position thus confirmed and a sample of the bottom obtained, Captain Livingston decides what sort of grapnel he will put down—long barbs for muddy or sandy bottom, shorter ones for clay, and round, stubby ones for a rocky bottom.



Reeling in the cable. The broken ends were found from three to seventy-eight miles apart. In such long stretches there were, of course, many other breaks, but the cable was covered so deeply with mud and clay that it was impracticable to bring it to the surface—being old, the chances are it would not have stood the strain.

Captain Livingston and Hunter, navigating officer, take advantage of a clear day to "shoot the sun."

Meanwhile the crew places a steel "mark" buoy, six feet in diameter and capable of sustaining two and a half tons, at the spot, anchoring it to the bottom. For while the chances are that they will be there only two days or so, they might still be grappling for that cable at the end of three or four weeks, during which time the buoy will be their guide. The buoy is equipped with two brilliant white lights, which are turned on at sunset and off at sunrise by a clockwork apparatus.

The John W. Mackay now steams to a point five or six miles distant and at right angles to the cable. Here the grapnel is heaved over the bow. At the end of an hour and a half, assuming that the depth is 1,650 fathoms, it will have reached the bottom. The ship then drags the grapnel across the ocean floor at right angles to the cable and, if the line is not hooked, beyond it for three or four miles, steaming at the rate of perhaps a mile an hour. With a fishline of steel cable covered with jute, a "flatfish" type of grapnel weighing three hundred pounds, and a steam-driven "reel" capable of winding in twenty tons, this extraordinary fishing expedition continues back and forth across the line at intervals of two or three miles.

In the bow of the ship, on the grapnel rope itself, sits the skipper; this is one job which he insists upon doing himself. But this is necessary only in shallow water. The rope runs over and under some sheaves to the dynamometer, which registers the strain, in hundredweights, upon a vertical scale. But the actual hooking of the cable makes no impression whatever on the indicator; the delicacy of touch of the born fisherman is required. It is a cold, wet job, but it is the only way to detect the gradual tightening that always accompanies the hooking of a cable; I tried it myself for half an hour one day.

When a cable is hooked, the news spreads immediately over the entire ship. Everyone knows, even if things go well, that three hours will be required to bring the line to the surface; yet all hands begin to congregate on the forward deck.

The captain stands on the fo'c'sle head, giving orders in a calm and unhurried manner to the quartermaster, who stands at the deck telegraph, about thirty feet abaft the sheaves. The skipper's glance alternates between the water just under the bow and the dynamometer. The ship, practically stationary, is being steered by the port and starboard engines, since she will not answer the helm satisfactorily when steaming at the rate of less than a mile an hour.

With the exception of the "hydrographer," these men have been watching cables come in over the bow for ten and twenty years—in the case of the chief steward and the splicer, thirty-eight; yet it is as fascinating to them as it is to me.

I glance at the indicator; it registers 12,000 pounds. This means that the grapnel is having fairly heavy going, probably through thick mud, but the pull is fairly regular. For a mile, two miles, three, the skipper trolls with his 300-pound hook, changing his position from one side to the other. For his is not a comfortable seat. A thick cushion would defeat his object by insulating him against the shock of the pick-up.

A Long, Expectant Wait

"Got 'er!" Captain Livingston suddenly announces, with a wide grin. Our eyes turn instinctively to the dynamometer, although no one questions the skipper's judgment. Sure enough, the indicator is beginning to climb. In less than half a minute it has gone to 26,000 pounds; there can be no doubt about it.

But the job is far from finished. Successfully to bring a cable from a depth of almost two miles requires experience and the sensitive hands of a jockey. Some of the cables were laid more than forty years ago, and the slightest error in judgment, or the sudden rise of the bow upon a wave, would cause the worn and corroded sheathing wires to snap. The ship must be maneuvered as carefully and as skillfully as an eight-oared shell.

The long line is pulled slowly in. There will be nothing for the crew to do in the next hour, for it will require that much time to haul up the grapnel; they scramble along the slippery deck to their quarters, gleeful at the prospect of a quick return to shore. The others heave sighs of relief, and the captain lights his pipe.

The steady grinding of the huge winches, taller than the average man, goes on for two hours. Half an hour for "supper," as it is called on board the John W. Mackay, and we congregate on the forward deck

again. Finally, out of the depths comes a length of chain.

"Easy!" shouts the captain; for the short length of chain connects the grapnel line with the hook itself. And then, almost before we realize it, the cable comes into view, twenty-five feet below the sheaves.

Two seamen have been festooning themselves with short lengths of small rope. Now they clamber into boatswain's chairs and are lowered by their mates over the bow. Sliding down to the grapnel line, they attach separate lengths of steel cable rope to the corroded strands, to take off some of the strain. Then they are hauled quickly back on board, and the winch completes the job of hauling the cable over the great pulley wheels on the fo'c'sle head. There it is cut with a hacksaw, and the landward end is connected with the chief electrician's testing room.

One Clear Day in Twenty-Four

In this cubicle is an amazing array of apparatus. How one man can get on familiar terms with so many complicated electrical gadgets in a lifetime is beyond the "hydrographer," but Carey, redheaded and efficient, soon has the galvanometer eating, figuratively speaking, out of his hand.

To a layman, the galvanometer looks like a brass cylinder about as large as a "dry ice" quart ice-cream container, stood on end. This, however, is merely the cover. Inside, and attached to a suspended coil, is a mirror which, through a "window" in the cylindrical cover, reflects upon a graduated transverse scale, about two feet distant, the rays from a stationary flashlight set directly beneath the scale. In other words, as the coil within the cylinder oscillates, the distance it swings is measured on the scale.

We have picked up the New York end of the cable. Now, the total electrical resistance of the cable in ohms is proportional to the mileage; Carey's tests indicate that the ship is 899 miles from New York.

With his siphon recorder, Carey now communicates with shore and finds the cable in good condition; he then makes tests which indicate that the cable has been picked up fourteen miles short of the break. The severed ends are spliced together, and the John W. Mackay proceeds toward the actual break. There the end is anchored to a buoy, the ship picks up the other strand, and the cable is "joined through."

It isn't so simple as that, of course. Stormy weather, heavy swells from recent gales, fog—any of these can hold up cable-repair operations for a week or more at a time. I have said that the John W. Mackay enjoyed only one clear day during its first 24-day voyage. On its second, begun two days before Christmas, the indefatigable skipper kept her at sea exactly two months, and in that time the crew sampled all the forms of dirty weather the North Atlantic can offer in the middle of winter. Gale, snowstorm, heavy swell, rough sea, fog, moderate gale—these entries appear with monotonous regularity in the log.

As against this, I could find only two days when the weather was suitable for cable-repair work. Day after day these linemen of the sea were unable to get an observation. And that means enforced idleness, for a cable-repair ship must know where it is at all times; it cannot afford to hook some other company's cable.

Despite these handicaps, the John W. Mackay, on the last day of December, won the race to get the first of the broken cables in service. The Western Union vessel came second, on January eighth, and Captain Livingston scored again the following day. The first job involved a bit of navigating by dead reckoning that would stir even a landlubber's blood. At the beginning of the series of "drives" I find these daily entries in the log:

> Completed four-mile drive; unsuccessful. Easterly gale; thick snow; unable locate buoy.
>
> Hooked cable; badly damaged by earthquake. Cable parted near bow. This indicates cable deeply buried, perhaps by landslide.
>
> Hooked cable; moderate swell. Put in 78½ miles. Tested through O.K.

But here is the story, which wasn't considered of sufficient importance to put in the log: They payed out those 78½ miles in a dense fog, when other ships hove to, unable to get observations. Neither could Captain Livingston get his bearings, but with an

Changing lights on a cable buoy. When the point of the break is found, electricians test it to see that the line is clear to the shore station. The end is then anchored to such a buoy as the one above, and the ship goes off to find the other end. The buoys can sustain a weight of two and a half tons.

instinct for weather that is uncanny, he decided to lay the new splice by dead reckoning—something almost unheard of in cable-repair work. With cable costing from $2,000 to $5,000 a mile, no company can afford to waste even half a mile.

But the skipper of the John W. Mackay felt "in his bones" that a good blow was in prospect; so he took the chance and payed out the cable—two hundred thousand dollars' worth. At the end of a 75-mile run he stopped; and when the fog lifted, there was the buoy, three miles dead ahead! That, I maintain, is navigation.

Incidentally, the final tests were scarcely completed when a 42-mile gale, accompanied by high seas that probably would have set their buoy adrift, came up out of the southwest and continued unabated for two days.

All in the Day's Work

And so it goes. There are no regular hours on board a cable-repair ship. A final splice may be finished, after working all night, as late as four o'clock in the morning. Yet no one ever crawls between his blankets until the job is finished and one of the land stations reports by wireless that all is O. K.

And it always is O. K., for the chief splicer, Sage, had been splicing cables for forty years. Out of thousands of splices, only one has ever given trouble. Sage is eligible for a retirement pension, but he refuses to spend the rest of his life ashore.

The same is true of Chief Steward Smith; they like it on board the John W. Mackay. So, for that matter, do the crew; their wages are higher, food is better, and opportunities for overtime are greater than they would be on board the ordinary steamship. Some of the crew have been with the cable-repair ship ever since she came off the ways, eight years ago. The cable foreman's son is a quartermaster on board. He was on watch at the gangway the day I arrived, and brought my baggage to the stateroom. Nor would he accept a half-dollar for his trouble. "We get good wages," he informed me.

Every Sunday evening these God-fearing people hold services in their quarters. Their lives are frequently in danger; more than once they have had a boat smashed against the hull as they attempted to launch it or on returning from changing the lights on a buoy.

So very dangerous is this operation, in fact, that you will always see half a dozen ropes dangling from the davits to the water's edge, where the men can grasp them in case of accident.

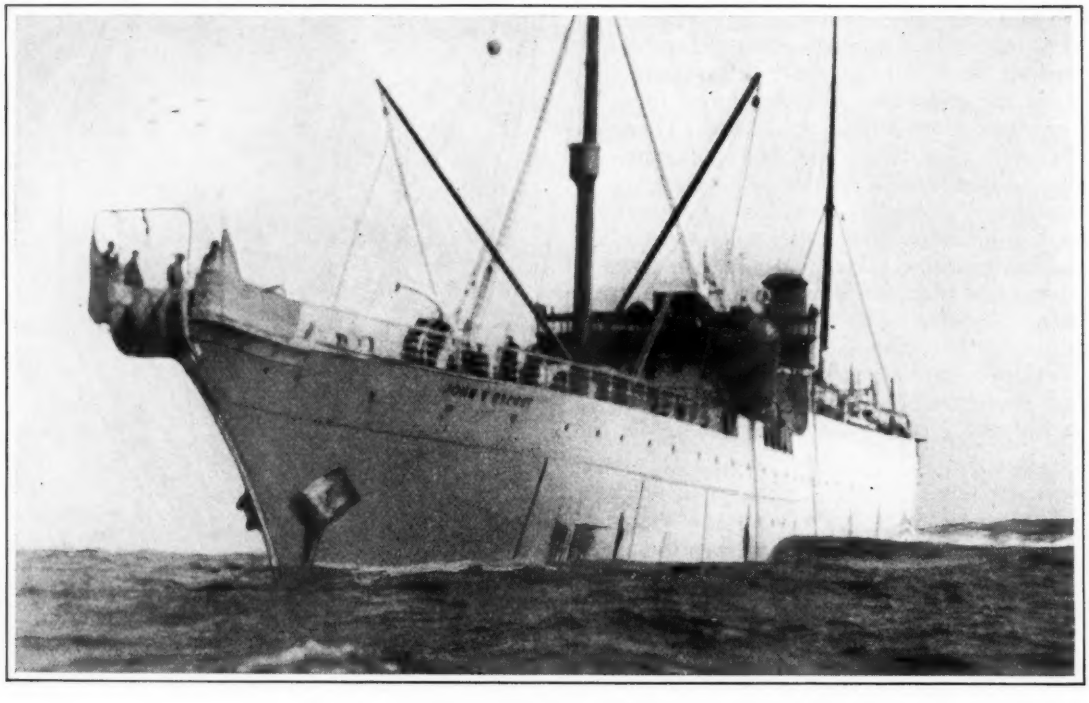
On two occasions when I went out in a boat to get photographs of a man changing lights, we might easily have been swamped but for the lightning-quick action of young Strickland, at the steering oar.

The job of taking up the buoy is no less dangerous, particularly in a rough sea. Once, when a boat's crew was loosing the moorings the buoy, six feet in diameter and built of steel, disappeared for a second in a trough of the sea. At the same instant the whaleboat shot forward on the crest of another, drawn by the rope attached to the buoy, and came down—smack!—upon the unyielding surface. The bottom of the whaleboat, of course, was stove in.

But the crew took off their coats and stuffed them into the ragged hole, while their companion atop the buoy finished his work. Then they rowed back to the ship.

It was all in the day's work.

All connections have been made. The cable, thousands of feet down on the bed of the Atlantic, is again humming with the important messages of a busy world, and the John W. Mackay heads home.



What Next for India?

By UPTON CLOSE

A CIVILIZATION may have features incompatible with humanism, such as massing of convicts in fire traps or child marriage or unemployment or caste, but none the less be "civilization." Vasco de Gama and Clive recognized that they had gone up against, in India, not primitives but complicatedly civilized people, and Hastings made pertinent remarks about it.

Only "Tommy" and "Clark" minds in India regard the native as uncivilized; they have done harm enough, but they do not count in the upshot. The real contest is between minds recognizing in one another an equal and yet thoroughly antagonistic civilization: Lord Irwin versus Gandhi.

British Library of Information

Lord Irwin, Viceroy, and V. J. Patel, Speaker of the Legislative Assembly, before his resignation in April, talking earnestly at a garden party given a few months ago at the Viceregal Lodge, Delhi. Trusted on both sides, Patel dealt a blow to Indian peace by casting his lot with Gandhi.

British dominion over India is the greatest example in world history of the conquest of one race and civilization by a different race of an antithetical civilization. It has brought into close and unfriendly contact probably the two most opposite and unyielding types of mind and culture in the world. The British conquest was a matter of opportunism, and, given such conditions of strangeness and uncertainty, British government could scarcely be other than "magnificent muddling." Out of the historical circumstances have grown most of the evils that beset British rule to-day. However, there are yet other complicating factors.

One is the natural angle of vision of the British people. India has provided the extent of sovereignty and to a large extent the income which has justified the proud British claim to first place on the roll of Powers during the past century. Dominion over India is the physical fact upon which has chiefly rested the assumption of the white man's supremacy among the races.

Again, under the complicating factor of the attitude of the British people comes the fact that a nation vassal to a democracy is likely to get the worst possible treatment. Under the East India Company, India was regarded as a vast plantation in which everyone was to work for the benefit of the owner. Along with this went a certain protective paternalism, a mixture of enlightened selfishness and human sympathy akin to that shown by the true "Southern gentleman" toward his slaves. When the Crown took control, India came under the absolutism of a small political bureaucracy interfered with only by sporadic questionings in Parliament.

Yet time and again through the seventy years of Crown rule we find these English autocrats endeavoring to procure for the fearfully taxed Indian peasant or discriminated-against Indian industrialist some easement of life, only to be overruled by a democratic political majority, afraid of losing the vote of Manchester, Worcestershire, or some other district which demanded imperially favored Indian markets for its local product and declined to share any burden of imperial conquest with Indians.

Viceroys Canning, Lawrence, Mayo, and Ripon and such honored retainers as Trevelyan and Fowler submitted minutes as ineffective as the humanitarian orations of John Bright and Gladstone on the wrongs done India. Under threat of the Chamber of Commerce of Manchester, Disraeli in 1880 compelled Salisbury (his Secretary of State for India) and his Viceroy, Lytton, to forgo their revenues from duties of English-made cotton goods, and extract the money for their border aggressions by further squeezing the peasants.

The governors of India found it impossible to get sufficient revenue from the peasants, and the matter was finally settled by charging Indians as much for the privilege of making cloth in India as Englishmen were charged for bringing theirs in. When English operatives voted as their employers told them, pressure came through Chambers of Commerce. The position of India does not appear much improved today, when workers are as concerned for the prosperity of their industry as are the owners, and voters' threats come through Labor party locals.

Pundits Patel and Nehru and Mahatma Gandhi may be pardoned for feeling that the accession of

British Library of Information

The Viceroy and Lady Irwin departing after the opening of the Council House at New Delhi in 1927. The war delayed the transfer of India's capital from Calcutta to the central city of Delhi. These ceremonies were the occasion for a gorgeous gathering of India's most powerful princes, usually enthusiastic supporters of the British.

labor to power in England, instead of helping them, and in spite of Ramsay MacDonald's and Wedgwood Benn's earlier diatribes on English injustice to India, puts the whole population of England, instead of a small plutocracy, athwart of India's rise.

But this is only a part. England's rule of India has been infinitely complicated by the rise of machine industry. Out of opportunities which presented themselves as a direct result of the conquest England built her first machine industries, and from such a germ has grown the industrial system which has conquered the West. That system is now conquering the East and is adding the economic clash to the political and racial antipathies.

And the greatest complication remains still to be outlined. It is the factor of the change of international and interracial morality since the days when the gentle poet Wordsworth expressed the simple code that "They should take who have the power, and they should keep who can."

Thousands of the most important supporters of Indian aspirations are in England. Indians en masse may disobey British regulations, but the sharpened humaneness of the English people will not permit a General Dyer to shoot them down. This change of world conscience in regard to the treatment of subject peoples is the most embarrassing of all the complicating factors in the Indian situation. It is the arm with which Gandhi, wise as well as saintly, strikes a blow such as no ruling class ever yet was called upon to parry, save only the Cæsars who struggled vainly against the rise of Christian dominance in declining Rome.

Fifty years ago Gandhi would have been shot and forgotten; to-day he would be least forgotten if shot.

The people of India have risen again in serious revolt against the British. Where must the blame for the recent bloodshed be placed, and where are British power and Indian revolt headed? Upton Close, who has long been familiar with Indian affairs, places the responsibility squarely and heavily on English shoulders and points to a still more rocky road ahead in writing on this highly controversial subject. His point of view is entitled to a thoughtful hearing.

Whether or not Indians would have been better off if untouched by England is a hypothetical question in which anyone will allow the English the benefit of the doubt. Probably no reader of this article would feel that they would have been more fortunate as a prey to Portugal or to Russian or even French conquest—although in any one of these cases the racial snobbery between conquerors and conquered might have been less acute. British conquest at least kept India from being torn, as was China, by rival European ambitions.

The alternative to British rule in the past century and a half would doubtless be a succession of wars of princes through which a native power would have achieved the sovereignty of the Mogul throne, at least in theory. The wars would have kept down the population, and the toll exacted by ruler and ruling caste would have been heavy but spent in the land and redistributed among the people, not shipped out. Native craftsmanship would have been patronized and the beginnings of factory industry protected, we may assume, as much as in China. Village councils would have kept down the extortion of landlords and taxgatherers. The awakening of social conscience and reform would probably have been a slower and yet healthier growth. India left to such influences as have been brought to bear upon China would probably, due to her deeper religiosity, have been half a century behind China in these developments.

"Sympathy and Regrets"

One may strike his own balance regarding British rule in India, but the point of the matter to-day is this: that, as founded and conducted for the past hundred and fifty years, it is not in consonance with the conscience of the modern world.

The difficulties in which this rule has left its subjects plunged, even though there be extenuating circumstances, are damning. Nowhere will a student find condemnation more frankly set forth than in the minutes of English administrators and reports of parliamentary investigative commissions. One must admire the

Englishman's frank and voluminous criticism of his own imperial creations, but one cannot admire the large gap between his self-criticism and his self-improvement.

Probably the fact that Englishmen themselves have been so outspoken on evils of their rule in India has in a large measure distracted the conscience of the world from concern with those evils. The Indian economist Dutt says mildly: "A cynic might remark that as the flow of wealth from India to England increased in volume England paid back the debt by copious streams of sympathy and regrets."

Both Race and Culture at Odds

Let us define the symptoms, as recognized by British "physicians" themselves, of the disease caused by the military imposition of one culture and race upon another. If the conquest was to be made they could not have been avoided. I have found no student who claims that they can be cured under the necessary disabilities of alien rule, although honest efforts were made to alleviate them by the humanitarian administrators of the Company and sympathetic viceroys such as Sir John Lawrence. Their alleviation has been a matter of controlling policy of the Indian government since 1900. British reactionism and Indian resentment have given little opportunity for the carrying out of this policy, and it has probably been introduced too late for any hope of success under alien administration.

The principle of divided sovereignty was first manifested in the division of authority between native dignitaries and the conquerors in a multiplicity of varying arrangements, which have come down to us in the present-day problem of the native princes. It was easy for this to grow into a diversity of land-holding, taxation, and administrative systems under the British Raj directly.

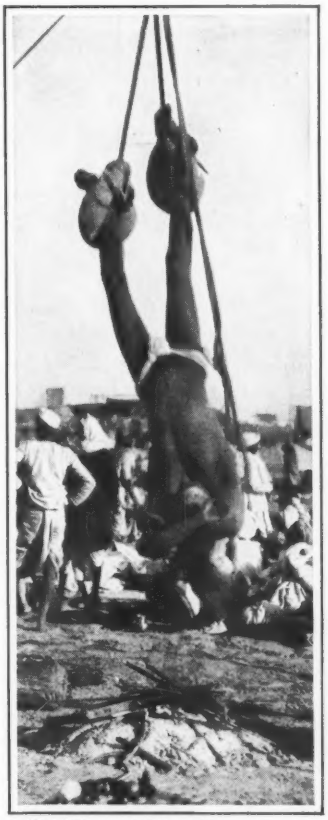
The latest and most malignant form of this cancer, gravest problem against which the new nationalism is struggling, is communalism—the creation of political consciousness along sectarian lines. The fairest of English students, G. T. Garrett, in his Indian Commentary, sets forth that in India religious sects have dwelt together under the same rule in as much or more peace than they have in Europe and America. It is political manipulation of religious feelings that has caused bloodshed, just as in the West.

For the injection of this element the British cannot escape some share of culpability. In 1850 Lord Elphinstone, after whom theaters are named throughout India, emphasized that the old Roman motto, "Divide and Conquer," must be British policy in Asia. In our own century Ramsay MacDonald has charged that the Moslems and Hindus were maliciously set at one another's throats by the introduction of a system of voting not as citizens of the Empire but as members of sects.

The last Indian National Congress and Mahatma Gandhi have called down on themselves the wrath of the more bigoted section of the Moslem community by adopting the statesmanlike policy of declaring for the complete abolition of communal voting. What, they ask, would happen in Germany, England, or America if Catholics voted for a set number of Catholic representatives and Protestants for Protestant representatives, while antichurchmen were represented by a fixed number of infidels?

The second most deplorable inheritance of British rule is in government finance and national economics. Opium monopoly is immoral and salt monopoly is medieval, but neither deeply affects the economic life of India. What should be talked about are the bleeding of the land, the stifling of industry, and the transfusion of wealth to England. The bulking item in the budget before tariff days was the land tax, now given over to the provincial administration. The theory that the Raj owns the land and collects an economic rent of half the produce has worked, even though applied lightly in catastrophe, to deprive the peasant of savings from his labor and even of sufficient food for himself and family.

Fixing of the tax in cash (in pre-British days it was in kind and flexible) has compelled peasants to dump their crops on the market for what shrewd buyers will give and often additionally to borrow money from usurers. Official figures state that one-third are inextricably in debt and another third are in debt "with hope." The most salable, not the most economic, crop is raised, the land is given no rest, and the peasant cannot buy manure and must even sell what his farm produces. The grain that should make Indian muscle and brain flows through the hands of an undernourished peasantry to foreign countries.



British Library of Information

India's holy men, fakirs, yogis, and ascetics are a considerable part of the population. This one has caused himself to be suspended, head down, over a blazing fire.

Calicoes and Muslins

Pressure of the military and of the bondholders on the Indian budget does not permit of fundamental reform which would extend to the peasant hope of building up his estate—a hope which even Soviet Russia has recognized to be needful. Such is the condition of 72 per cent, or two hundred and twenty millions, of the Indian people.

Now for industry. The first decades of European contact brought great additional prosperity to the cotton and silk weaving, brass beating, and other Indian crafts. These industries, which had brought a flow of gold into India from the time of the Pharaohs, had reached probably the highest development of

industries in any country previous to the machine age. It was chiefly by exporting Indian products to England, her colonies, and the Continent that the East India Company made 117 per cent in dividends for its stockholders during the first few decades of its history. Our great-grandmothers were clothed in calico—handmade and beautiful, not the machine-made imitation—and swaddled their babies in Dacca muslin.

Then Came the Machine Age

Then came Isaac Watts with his steam engine, there followed the power gin, spindle, and loom, and the machine was set to work in industry first to imitate the weaving craftsmen of India.

English capitalists launched upon the industrial revolution and, leading the world therein, found their interests in direct conflict with the industrial prosperity of India, which they held in their power. In the early half of the nineteenth century England, which has at times objected so strenuously to the American policy of protection, placed from 67 to 84 per cent protective duties against Indian cloth. The entire trade was in English hands; and by 1823 Dacca muslins, which had clothed Egyptians, Greeks, and Romans, ceased to be exported. Pathetic pictures of the suffering of Indian craftsmen and reversion to the jungle of great industrial towns are painted by contemporary English writers.

It was only a short time until the trade of the Company had reversed, and Lancashire cloths, imperially protected from Indian duties of any consequence, were ruining the weavers' home market as well. To a lesser degree this occurred in all Indian industries. English machines weaving Chinese raw silk practically ended the Indian silk industry. The policy of the British government in India was (under duress) not tariff for the protection of home industry but the reverse. Students of Chinese history know how a similar policy was attempted there. Two thirds of India's craftsmen, numbering with their families probably fifty million persons, were thrown back on the soil, where conditions were already on starvation scale.

The remaining third struggled on with constantly lowered prestige and standard of living, while the guild-craftsman class, once the backbone of Indian city life, went virtually out of existence.

In the last quarter of the nineteenth century and the first of the twentieth a native machine industry, struggling against the stifling control of English manufacturers, has gained a foothold. During the World War it enjoyed an ephemeral prosperity and compelled the remedying of some injustices. It is hardly yet on its own legs, as witness the sale of a large share in the Tata steel company to American financial interests within the year.

The English have consoled their consciences by the catchword that India should be predominantly an agricultural country, furnishing raw materials to be made up in English factories and rebought in finished form. But they have done little to aid and much to hinder agricultural prosperity there. Of late there has been some manufacturing under British capital in India. The starvation wages remain in India, and the indefensibly excessive dividends go back to England. The development in no whit tends to attract the sympathy to Indian industry of the Labor party now controlling England. Manufacturers may be able to move their capital in some degree to India, but English workmen can hardly go there to labor.

The fiscal policy of the Raj is equally harmful to India; and it would seem indefensible except on the theory, never questioned at the time of the British invasion, that a victor nation has a right to drain off the wealth of the vanquished. The East India Company levied tribute on India (in addition to military loot) estimated at seven hundred and fifty million dollars. This was exceedingly modest, in view of what has happened since.

A Staggering National Debt

When the Crown took over in 1858 it charged the East India Company's sixty million dollars of capital stock and three hundred and forty-five million dollars of working credit forthwith to the Indian people, as a national debt under which to begin happy existence (and interest paying) as an imperial domain. For an analogy one would have to imagine the inhabitants of the Louisiana territory charged with the price of the purchase. The debt was made a respectable item by adding two hundred million dollars, to cover costs and damages of the Indian Mutiny.

The British treasury gave English holders the opportunity to demand the highest interest on the liability by declining to guarantee India's national debt, although every lender knew she would never be allowed to default. The debt has gone up in a succession of bounds, with no sinking fund to reduce it; to-day it is three billion, seven

© Mondiale

This palatial building, completed within the year, is merely the guest house of the Maharajah of Mysore. The province is perhaps the most prosperous native state in India. Guests here have five-room suites, an expensive automobile for their private use, and five servants, one of whom is a chauffeur.

© L. Green from Publishers Photo Service

Victoria Memorial at Calcutta erected to the first empress of India. It was only in 1858 that the government of this enormous country was taken from the East India Company and placed under the crown. Calcutta, formerly the capital, is one of the busiest ports in the world and from it flows a large portion of India's enormous wealth.

hundred and fifty million dollars, or $12.50 per capita. One billion dollars were added to help in the World War.

From 1860 to 1900, twenty-five thousand miles of railways were built, more to satisfy military strategy and service English importers and exporters than with the self-contained economic needs of India in mind. They were largely built by private capital under state guaranty of profit on total investment and ultimate purchase—a system which Sir John Lawrence described as the most extravagant and reckless imaginable. Indian railways with equipment built to 1870, according to Lord George Hamilton's parliamentary report, cost eighty thousand dollars per mile—considerably more than railway building in Texas in 1930.

They are antiquated, comfortless for passengers, and inefficient and inadequate as freight carriers, having some of the highest tariffs in the world. It is cheaper to send coal from England than from Bengal to Bombay, and butter from Australia than from Allahabad, although these tariffs may in part represent favoritism to foreign products rather than economic rates.

Meanwhile irrigation and canals, so immensely more valuable to the economic life of India, in spite of protagonists like Sir Arthur Cotton and John Bright, were overlooked. To 1902 the total outlay on the latter had been one hundred and twenty million dollars; on railways one billion, thirty million dollars. Had the ratio been the other way Indian agriculture might, in spite of the tremendous burdens put upon it, have carried the nation into prosperity, and the succession of terrible famines of the past fifty years avoided.

The Conquered Nation Pays

Two other evil traditions have left an apparently incurable mark on Indian economics. One is the access to Indian revenues which enabled imperialists like Palmerston, Dalhousie, Disraeli, and Salisbury to stir up and prosecute wars on the border, in China, Malaya, Abyssinia, Afghanistan, Egypt, and the Sudan, charging the costs to the Indian taxpayer. One needs only to read history to realize the unrestrained imperialism of a clique that didn't have to answer to its people for the cost of its enterprises but always could plan to levy these against a conquered, voiceless people.

Only once did a British stroke of conscience make substantial reparation—when Gladstone credited India with twenty-five million dollars on the Afghan war of 1878. India, however, bore the remaining cost of ninety million dollars.

"Home Charges"—but not Home Rule

Military charges remain the bulking item of Indian budget expenditures, amounting, according to the statistical methods of the Bureau of Information, to 30 per cent of the total (including provincial expenditures and excluding war-debt services) and, according to methods of reckoning used more generally, to between 60 and 70 per cent. Education takes 5 per cent and irrigation two. The Indian army is the most expensive of its size in the world, costing the Indian taxpayer more than the military establishment of Japan. Parliament has authorized an Indian navy, to be built by Indian money but controlled by the British overlordship—a navy which, by the way, is outside the bounds of the international limitation pact.

There remains the custom of "Home Charges." When the Company was legislated out of India it was sending about seventeen million, five hundred thousand dollars a year of tax revenues to London. These covered dividends of stockholders, salaries, furloughs, and pensions. Under the Crown the home charges increased fivefold in fifty years, although the wealth of the people had not increased. In the period 1924-30 the home charges averaged one hundred and fifty million dollars a year, between one half and one third of the total national plus provincial revenues of India.

These paid for debt services, national and railway; leaves and pensions for English civil servants and soldiers, military stores, a school to train Englishmen for positions in India, salaries for the Secretary of State for India and his fifteen Councillors, telegraph services, and every clerk and scrubwoman in the India Office.

Colonies other than India are not required to pay the upkeep of their "home office" and cabinet minister in London. It would seem that the home of the Indian government should be India. Obviously no nation can sustain the regular shipment out of itself of one third of its tax collections without hopeless impoverishment. China's Boxer indemnity, Europe's war debts to America were far lighter—and they have had to be largely forgotten.

In addition there is privately sent out of India from fifty to two hundred million dollars a year as savings of the 130,000 Englishmen employed by government or in business there, and from one to three hundred million dollars a year in dividends on the two billion pounds of British money in Indian enterprises. Never before in history has a nation been held by perpetual aliens who shipped wealth out of the country in such a stream.

Economically the most unrestrained looting by invaders who would retain their spoils within the country would be preferable. Gandhi says: "You say you protect the northwest frontier from invasion. . . . Rather let us have the savage tribes. The Moguls came from there and gave us prosperity. You forget that you yourselves are perpetual invaders who never settle down."

However just one may feel the British rule to be, it is obviously ruinous, with its traditions of military upkeep, favoritism to British industry, sapping of agriculture, and highest paid and pensioned civil service in the world. Indians, by English admission, can do the government work, and for one tenth the cost. The tradition of high pay is long. Macaulay, who earned one thousand dollars a year in England, wrote with delight to his sister when he discovered his emoluments were seventy-five thousand dollars in India.

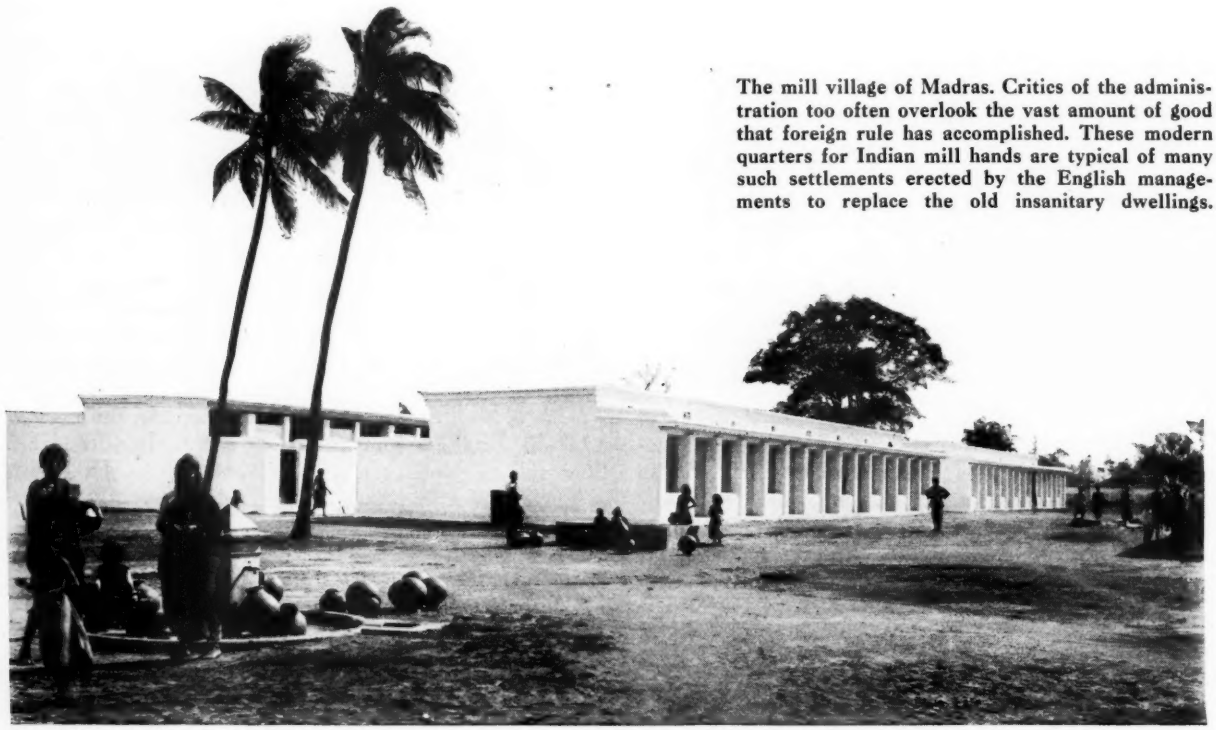
It is impossible to see how any of these traditions can be eradicated under English rule. They have become an integral part of that rule, though British administrators, fully appreciating their harm, have fought against them in vain for a century.

While the military budget has increased two hundred and fifteen million dollars that for education has increased ten millions. Sir Henry Brackenbury testified, before the World War, "I cannot but feel that Britain's interest in keeping India under British rule is enormous. India affords employment to thousands of Britons; India employs millions of British capital; and Indian commerce is of immense value to Great Britain. Therefore it seems to me that . . . not only for India's sake but also for Great Britain's sake, Great Britain should pay a share of the expenditure for this purpose . . . and I think England should behave generously, because England is a rich country and India is a poor country."

When Clive sailed from her shores, England was one of the poorest nations of Europe. India was perhaps the richest in bullion stores in the world. When Sir Henry spoke, England was the richest in the world, India one of the poorest.

But to-day the English people are again poor—a further complicating factor. A professed liberal and humanitarian government has no leeway to be liberal with its vassal. The money market of London is not prepared to do without its hundred million pounds or so of cash remittances from India yearly. The squires of England are not prepared to forgo high employment for their minor sons as Indian civil servants. The owners and operatives of Lancashire looms and Worcestershire salt refineries face ruin if they give up the Indian market to native industry. British shipping, threatened by America, Japan, and Germany, cannot now give up its "all the traffic will bear" monopolies on the Indian coast. British investors cannot risk their four hundred million pounds

(*Continued on Page 110*)



The mill village of Madras. Critics of the administration too often overlook the vast amount of good that foreign rule has accomplished. These modern quarters for Indian mill hands are typical of many such settlements erected by the English managements to replace the old insanitary dwellings.

British Library of Information

Haiti Takes a Day in Court

By AUGUSTA W. HINSHAW

THE South American good-will trip which was President Hoover's preliminary act of administration was regarded by some of his countrymen as a stratagem to avoid office seekers, and by others as an opportune gesture of friendliness to secure preferred trade relations with our Latin neighbors.

But to those who had watched the workings of Hoover's mind closest and longest it had another aspect.

It meant that Hoover had discovered America—had looked ahead half a century to the development which is certain to follow new means of transportation and communication in this hemisphere and to make our relations with our neighbors, particularly to the south, of quite as much importance as our relations with Europe, political and social as well as economic.

The recent riots in Haiti were straws in the wind. The outcome was watched in the Philippines, South America, the English foreign office, and at home. The President sent a commission. It was on the verge of failure when a simple, spontaneous gesture of sincere human nature changed the outlook from one of bloodshed to constructive optimism.

Since 1915 the sore thumb of South American antipathy to Yankee diplomacy has been Haiti. Our loans have been wanted and even our industries; but the money lender is never a hero, and we have been freely suspected of cutting our pound of flesh from the heart of a struggling republic whenever we might find it expedient. The classic example of our hardness and meanness was Haiti. But Hoover couldn't stop at Haiti, didn't even mention the little republic in his regrets, and to all appearances was unaware of her grievances until last October, when the volcano, quiet for eight years, began smoking revolution again.

An accretion of all the resentment against American supervision of "puppet Haitian government" gathered round the nucleus of a student strike. We were obliged to put our hand to our hip pocket to prevent the overthrow of the existing government; the alternative seemed annihilation of our occupation's accomplishments, eight years of which, even in the opinion of our severest critics, have laid the foundations in Haiti of health, wealth, and a degree of literacy which alone could insure democracy. That no government ever stayed in power in Haiti except by use or threat of armed force did not stem Opposition indignation.

The President sent them to Haiti to investigate, listen, report back. Left to right—William Allen White, Elie Vezina, Chairman W. Cameron Forbes, H. P. Fletcher, and James Kerney.

In the two arched bridge of islands between the northeast tip of Venezuela and the Atlantic coast of Florida inclosing the Caribbean Sea the central island is Haiti. The western third, separated from Cuba by the windward passage, is the Republic of Haiti. Its population is Negro, with a small proportion of mulattoes descended from French planters and their slaves who, under the leadership of the Negro, Toussaint L'Ouverture, drove their Bourbon overlords into the sea and inaugurated the colony's struggles to become self-governing. The language of the masses is a French patois of from four to eight hundred words. The ruling class speaks French.

Fourteen Years of Occupation

The peasantry have cultivated the land and gathered the crops of coffee, sugar, sisal, and cotton, first as slaves of the French aristocrats and, after the establishment of the republic in 1804, as the economic slaves of the "Elite." The estimated proportion of the illiterate masses is from 85 to 95 per cent. The culture of the Elite, on the other hand, is said to surpass immeasurably that of any other mulatto or Negro.

The Elite are the propertied and educated Haitians who are in spirit and in fact, for the most part, descendants of the freedmen whose fathers were French noblemen and whose mothers were slaves. What is called "the doctrine of the Elite," in Haiti, is simply the divine right of the aristocracy to rule. These aristocrats, as a rule, are educated in French schools and universities. Since there has been virtually no education for the masses, there is no middle class.

The temptation to tyranny under such conditions has been too great to prevent government by the few, whose individual ambitions led to successive attempts to overthrow one another. These culminated during the years 1911–1915 in the overthrow of three presidents and the assassination of three. When the resultant turmoil and financial instability threatened the instant intervention of Europe the United States asserted her recognized police right in this hemisphere and did the intervening.

Whatever position one may take as to the international ethics of our forcing a protectorate on the rudderless little republic—it was in 1916 and Germany was doing her utmost to get the harbor of Mole Saint Nicholas, the port nearest Cuba—there was nothing much to boast of about the American occupation except that Haiti did get her finances in order, presidents were no longer in fear of their lives, and the passage to Panama was kept neutral.

After a United States Senate investigation in 1922, however, the military régime was given a more civilian character, and we devoted ourselves to an extraordinarily humanitarian program, establishing what is called the Service technique, with departments of public health, public works, sanitary and civil engineering, agriculture, and education. American experts were placed in charge and were expected to train Haitians to fill assistant posts and eventually to take over the direction of the whole public improvement program.

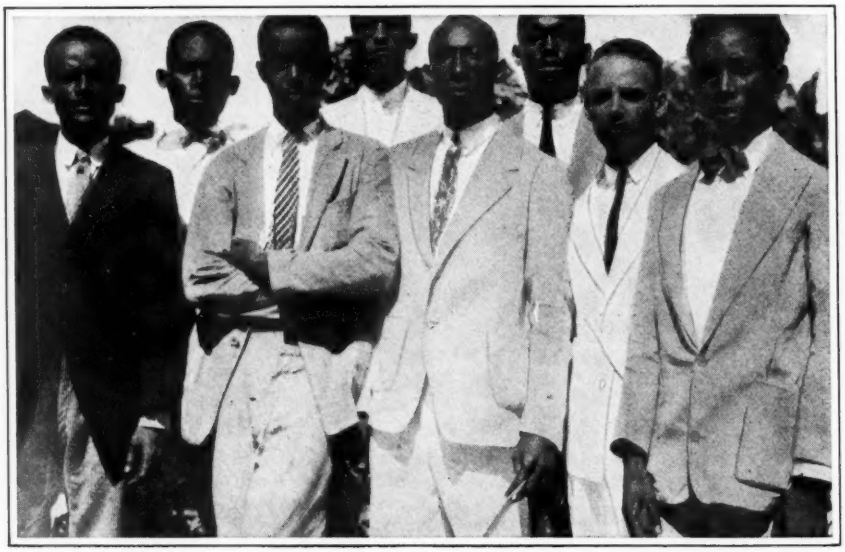
Everyone should have been happy, but nobody was. The occupation government was probably as efficient, concentrated, and purposefully organized as our own was during the war. But the patriotism of the Haitians flowed against instead of with this sweeping reorganization of their lives. Our treaty officials and experts were exerting an earnest, sincere effort to give Haiti all the benefits of American methods—only to find themselves as popular with Haitians as the benevolent Widow Douglas with Huckleberry Finn.

We came; we saw the chaos; we conquered the virus of violence, for the time at least. But the Haitians—the articulate, ruling class—wanted us more and more fervently to get out; to abandon our Roman roads and aqueducts, our newfangled notions of fighting cotton worms and cattle tuberculosis, and our ruthless insistence on standard weights and measures and on keeping the rock dust out of coffee, and leave them to their leisured, cultured, eighteenth-century way of life.

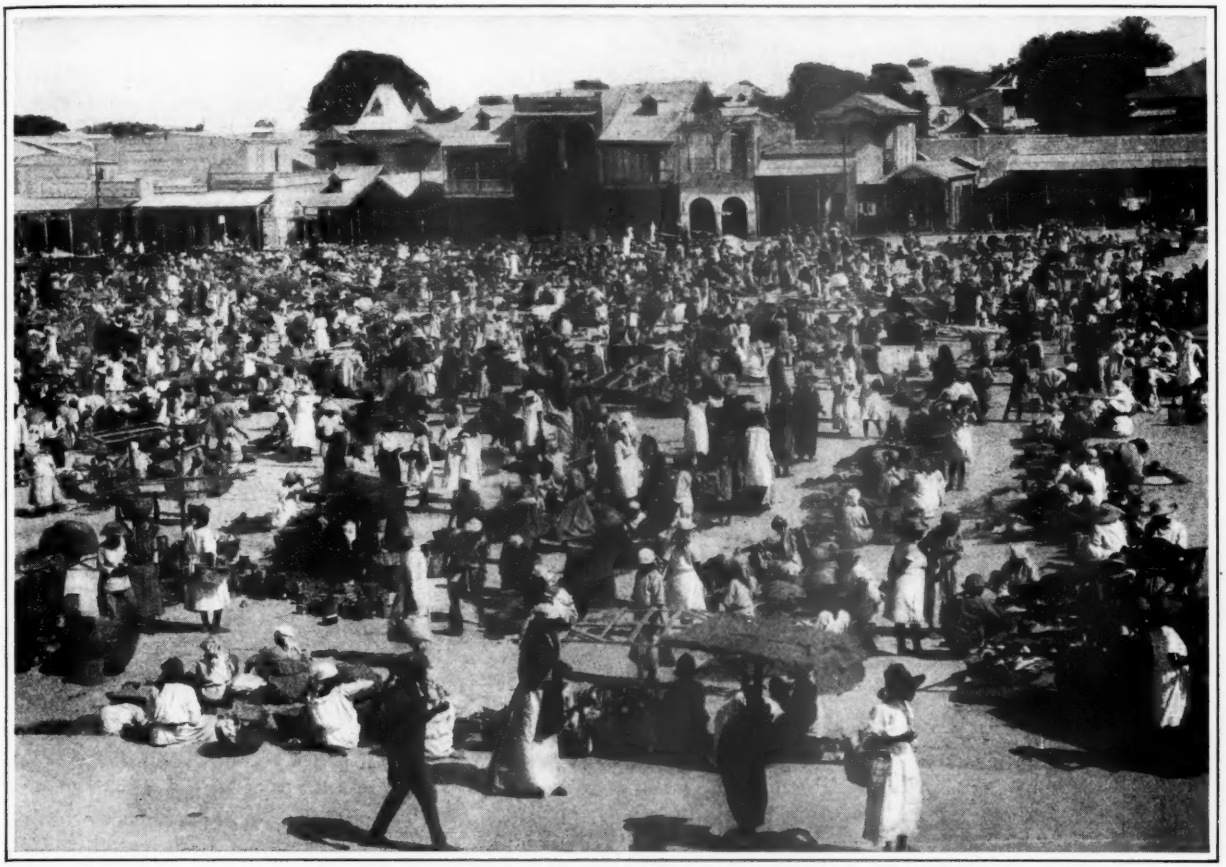
Into this situation, highly accentuated by the student revolution and the ultimate recourse to military force at Aux Cayes, was injected President Hoover's commission of inquiry. The warmth of the Opposition's welcome to the commissioners whom they expected to lead them out of bondage was equaled the following morning by the frigidity to which the reception was congealed by a single word.

"Inquiry," in the announcement to the press, was translated to mean inquest or post mortem—a review of the turbulent preoccupation history—rather than the investigation into existing conditions undertaken by the commission.

On top of this the story was given currency that the commission was coming to permit the council



The Damien students, headed by Justin Sam, center, led the recent revolt which led to the riots at Aux Cayes, in which the Marines killed and wounded several. Official reports and reports from Haitian sources differed widely in listing the number of casualties resulting.



The great square before the cathedral at Port-au-Prince, the largest and the most interesting public market in the West Indies. Here the natives from the country come to buy, sell, and to discuss the progress of the government.

of state (an emergency governing body) to reëlect the present president, Louis Borno, who for two terms has held his reluctant countrymen to what he conceives as the higher patriotism: letting America hold the lid on revolution while the scars of anarchy heal.

The people said they would stand up and be mowed down, together with their women and children, by American machine guns rather than countenance the continuation of a government whose strings they felt were pulled by American treaty officials.

Revolution rumbled, and the commission was boycotted. At its first hearing on Saturday morning, to which everyone with a grievance was invited, no member of the Opposition appeared. In the streets there were continuous demonstrations of resentment. One procession followed another, chanting songs of oppression, carrying banners denouncing the American occupation and all its works, and letting the new arrivals understand that Haiti was not to be snared out of her birthright again by the conciliatory pottage a committee of lame-duck congressmen might offer. A superficial investigation, prejudiced in favor of our officers and experts, was what the Haitians were expecting.

They had reckoned without Hoover. There had been no new Haitian manifesto. There was no indication that Hoover was seeking the means by which we might help Haiti to help herself rather than continue an expedient governmental pedagogy of showing Haiti how by doing it ourselves. The approach to the Haitian problem was typical of Hoover technique—infiltration as opposed to impaction of ideas; a minimum of promise, the utmost in performance.

Hoover has said that he gets things started by defining jobs and setting men with imagination and capability to work. He appointed a commission. The Haitians could not know there was promise in its personnel; nor that through it Hoover hoped the American people might learn the whole truth about their occupation.

It was the personnel, however, which disclosed the Hoover attitude; which made superfluous the Opposition irony in italicizing the *more definite* policy Hoover asked the commission to find. The Haitian commission was not composed of distinguished senators nor of distinctionless Republicans with an indefinite Democrat for window dressing. There was no effort to spread Administration recognition over the forty-eight states but instead to represent the spread of sentiment from Williamstown and Madison to Wall and Nassau Streets; from enlightened Harlem and Tuskegee to, say, Atlanta.

The commissioners were not dyed in one point of view. The chairman, W. Cameron Forbes, is a man experienced in the practical problems of wet-nursing infant governments—he helped establish our colonial government in the Philippines and has been governor general there.

Henry P. Fletcher is a seasoned diplomat who has not lost the adventurous and first-aid American attitude which made him a Rough Rider. And in Mexico he learned how it feels to be on the inside of an

American embassy to a Latin American country. A frequenter of Washington's official circles, he could not have been unacquainted with the Topsy of the State Department or the Peck's Bad Boy of the Navy.

Elie Vezina, of Rhode Island, is the representative in the United States of the French Canadian Order of Saint John the Baptist—corresponding to our Knights of Columbus—and knows the problems of the Catholic church in Haiti. James Kerney, also a Catholic, is the Democratic publisher of a New Jersey newspaper who wrote a discriminating biography of Woodrow Wilson.

Soft-Hatted Diplomats

William Allen White is the editor of the Emporia Gazette. He is the intimate personal friend of Walter Lippman, Senator Borah, Cyrus H. K. Curtis, the people of Kansas, and democracy. He was chosen for his sensitive nose for truth and to assure the public of getting all the truth—speaking out what might be needful. His gifts of discernment and analysis have been recognized by seven Presidents, and three have made use of them.

The Kansas editor went to Haiti as reporter extraordinary to the American people and as the soft-hatted diplomat of a sister, if somewhat bossy, republic. In the full-dress rigidities of international etiquette there would have been no room for the touch of common kindness that the whole world understands.

The kiss that wafted Haitian resentment and suspicion off Mr. White's fingers was as accidental as it was effective. It tapped the springs of friendliness in Haiti as spontaneously as it froze resentment of "corn-fed bumptiousness" and infringement of an article of the Nordic code in certain quarters of the United States. It aroused racial antipathies in America; in Haiti it pushed them aside to the plane where they belong, making room on that of common humanity for mutual trust.

Mr. White's account of the incident follows: "What actually happened was this: I had been in the church where the women were singing their patriotic prayers. I tried to get round the procession and into my hotel but was caught at the hotel gate; and, to avoid being rude, I stood for a moment looking at the parade."

An Overnight Change of Heart

"Suddenly a peasant woman, lean and gray and wrinkled and very black, wearing a blue calico gown, darted out of the line and knelt or bowed low before me, speaking excitedly in the Haitian-French patois which I could not understand and holding out a little homemade flag. I extended my hand to help her rise, and she darted back to the line. There she stood trembling for a few seconds and, the eyes of the leaders being on her, she and they and everyone were a bit embarrassed.

"It was not a diplomatic situation; it was just human. I smiled my prettiest and most reassuring smile and in lieu of language blew from my finger tips a kiss to the frightened old woman. The crowd caught quickly what I was trying to do for the awkward situation and cheered. That also was not international, just a human response. We all understood one another and were happy."

The Associated Press dispatch reported "the women leaders crying with happiness" and stated that the "roar of cheers was heard all over the city." Haiti was now ready to believe that finally a commission had arrived to study the situation without an ax to grind with the Marine Corps or with the finance group.

Following Saturday's boycott the hearings of the commission opened Monday morning to a full house. Every grievance of every responsible Haitian was heard. Public and private audiences were held, and briefs were filed. No one's reports were challenged; in only one instance a commissioner asked a perturbed citizen, concerning his account of an atrocity, "Was that not done under orders of the president of the republic?"

These witnesses of oppression in their testimonies ran the gamut of human resentment of invaded human rights, from alleged to actual. At the extreme left of the opposition to the American occupation was the black politician, Sam, who urged his followers to drive out the foreign tyrant by rousing the spirits of the dead to fight by their sides.

Loath to Pay the Price

At the farthest right the attorney for the "Federated Committee of the Associated Groups of the Opposition," Georges Leger, urbane, able, a prominent member of the Elite, smilingly suggested that the commission withdraw our marines for just a quarter of an hour. It is to be assumed that it would have been a pretty bad quarter of an hour for Borno, who, if he had been discoverable at all when the marines got back, might have been in the form of souvenirs. And the Haitian constitutional requirements, which prevented solution of the political crisis by the commission's appointing a compromise president, would have been met.

Fifteen minutes with the backs of our marines turned would have created the necessary vacancy in the presidential chair and have relieved Haiti of the chief champion of American occupation.

Haiti is grateful to be freed of typhoid, malaria, and of the great waves of dysentery that sweep over tropical countries. Most of all she is grateful to be increasingly relieved of yaws, a form of syphilis that formerly afflicted a great majority of the population. There are at present only 159 Haitian doctors, and they prefer to remain in the cities. The American doctors conduct rural clinics, carrying treatment to the remote parts of the island.

But Haiti is unwilling to pay the price of American occupation for her roads—fascinating though the chart showing 1,006 miles of improved roads, in various grades of standard surface, may be to an occupation engineer. There are less than 2,900 automobiles in Haiti; there were less than 400 in the beginning of the American era. The Elite do not regard speed as an essential of cultured life; they prefer ocean to land travel. The peasants, oppressed by an old road tax in the form of labor which American occupation officials revived in lieu of government funds, continue to walk in the little foot paths by the side of the road, which they have known and loved for centuries.

Haiti is grateful only with reservations for the seven irrigation projects reconditioned (these had fallen into decay and disuse since the French were driven out), for the eighteen miles of masonry-lined canals built, for the seventy-two miles of earth canals, for the three concrete diversion dams.

As for the improvement of a strain of Haitian cotton and its development into a long-fiber cotton which has sold for prices comparing favorably with Egyptian; soil surveys of river and plain territory and a method for the control of sugar-cane chlorosis; the orchards of leading varieties of citrus, avocados, mangoes, and other tropical fruits at Damien; the cattle-breeding stations in the rolling uplands; the compilation of data concerning labor cost, production cost, demands of foreign markets for Haitian products, tariffs, transportation and insurance rates; farm demonstrators and inspectors—as for these, the Haitian Elite lived comfortably without them, and the peasants still regard them as an unwelcome change from century-old habits rather than a promise of an enriched life.

The Haitians are not ready for a tractor civilization, especially when they feel the iron ribs of its wheels; they prefer the hand plow—and a wooden one. Their cultured class blooms like an orchid on a profusion of peasant labor so abundant that decay and waste do not matter. And many of the orchids are accustomed to the sustenance of what a Tammany man has called "honest graft." Obviously United States expert accountancy sours a live-and-let-live political philosophy.

The Commission Recommends—

Our commissioners report: "There is no room for doubt that Haiti, under the control of the American Occupation, has made great *material* progress." The nubbin of the whole report is the recommendation, "*That whether or not a certain loss of efficiency is entailed,* the new minister to Haiti be charged with the duty of carrying out the early Haitianization of the services." Freedom first, and then efficiency. The commissioners believe we should let the Haitians learn wisdom by their own mistakes—a hazardous adventure but the only one that will work in the long run.

"The failure," the commission's report states, "of the Occupation to understand the social problems of Haiti, its brusque attempt to plant democracy there by drill and harrow, its determination to set up a middle class—however wise and necessary it may seem to Americans—all these explain why, in part, the high hopes of our good works in this land have not been realized."

The second step in the change recommended by the commission reads: "That in retaining officers now in the Haitian service, or selecting new Americans for employment therein, the utmost care be taken that only those free from strong racial antipathies should be preferred."

Liquidation of Our Responsibilities

This and other recommendations have received the unstinted praise of the press of all shades of opinion. New York's Herald-Tribune, Times, and World, the New Republic, the Nation, the Manchester Guardian, the World Tomorrow—these and the Women's International League for Peace and Freedom, whose investigating committee created a furor with "Occupied Haiti," have expressed approval. The conservatives are not sanguine, and the radicals do not think the commission went far enough; but approval is unanimous.

As long as military force is needed to defend the service we render we cannot but remain in the position of the neighbor who protects a wife from a brutal husband. Haiti will despise us and return to the treacheries of her military oligarchy. If we can find a means of leaving their domestic strife to the Haitians we may be gladly retained as doctor, plumber, banker—even confessor and adviser.

The commission has recommended "the positive steps which will lead to the liquidation of our responsibilities," has prepared the way for the withdrawal of the American government's "representation abroad through military forces," to which President Hoover has voiced objection. The commission, however, "is under no delusions as to what may happen in Haiti."

But a revolution will not discredit the work of the commission nor wipe out its achievement: the presenting of the problem in new terms. If the first solution does not solve, then another must be found, but in terms of a new conception of our relation with the smaller republics of our half of the world.

A typical modern business street in Port-au-Prince, showing the fine cement pavements and streets and the new fireproof buildings. The cathedral looms in the distance. Americans may well be proud of the greater cleanliness of the cities and the health of the inhabitants since the occupation.

Cash and Carry

A survey of our five billion dollar chain-store industry

By SAMUEL CROWTHER

OFTEN it is said that this country is not afraid of size—that it no longer cares how big corporations grow. This is not quite true. People no longer care about the size of some corporations; in fact, they take some pride in the magnitude of General Motors, Ford, United States Steel, and other great companies. No one gets in the least excited over the merging of railways or public utilities.

These corporations, however, represent size that the public knows. The government fought big business through a long public agitation which culminated in a crop of dissolution suits, the chief of which was against the old Standard Oil Company. The doings of railways and utilities have been regulated through various Federal and state commissions. The public somehow feels that all these corporations have been attended to and will behave.

Mass distribution saves consumers at least half a billion dollars yearly, yet the trust-busters of to-day seek to curb the growth of the chain store, which had its beginnings back in 1859 and entered a new phase of development in 1921. Mr. Crowther discusses the meaning of this trend as it affects the community, the retailer, and the manufacturer.

The lurking fear of big business, however, still persists. It has only needed a focus. Now it has focused on big business in distribution. The public does not know big business in distribution, so to-day it is the chain store—which is big business in distribution—that is attracting the attention of the descendants of the old trust-busters.

The big cities are not interested in the fight, for city folk do not care much who serves them so long as they are well and cheaply served; but in the towns and smaller cities the chain store is the livest political and economic issue. Nearly every state legislature is considering or has passed some kind of law to destroy or to curb the growth of the chain store. Up to date none of the laws passed has stood the test of the courts, but one of these days a clever lawyer will find a law that is constitutional, and then we shall get down to bed rock on distribution.

The present distribution system of this country is so utterly incompetent and wasteful as to undo to a considerable extent the benefits of skilled manufacturing. The chain store has many faults, and probably it is only a step toward a completely new set-up in distribution, but at present it represents the most economical method we know of getting goods from the manufacturer to the consumer.

It is the nearest approach that we have to low-cost, mass distribution. It is annually

Even in the country districts and small towns, the old type of general store, which was generally the cross-roads of the community, is disappearing in the face of modern distribution, chain-store competition, and standardized brands of goods.

The new and familiar successor to the general store. With well-advertised products on its shelves, family shopping by the youngsters becomes a simple and almost mechanical, if not so thrilling an affair.

saving to consumers at least half a billion dollars in the cost of merchandising goods, and to that extent it is increasing the buying power of the country. The country learned through the corporate developments since the antitrust suits that only the great manufacturing organizations could pay high wages and still sell at low prices. The managers of these great corporations learned that too—for there is no blinking the fact that some of the great corporations were organized to do exactly the opposite. They were really prosecuted for their evil intentions rather than for their evil deeds.

There is no doubt that some of the least intelligently managed chain-store systems would like to do everything that their opponents are charging them with doing. But it is equally true that the more intelligently managed chains have learned that the only way to make money is by giving service. Chains are here to stay—until something better turns up. The attacks on them to date have been decidedly beneficial both to the public and to the chain stores. They have brought to the chain stores a higher sense of responsibility, which has of course benefited the public.

The question now is whether the special local interests which are leading the attacks will prevail over the public interest—for there can be no doubt but that the legitimate development of the chain store is in the public interest. There is also no doubt that some of the chain systems would be helped by some very drastic housecleaning.

A Hundred Thousand Outlets

Chain stores are by no means new. George H. Hartford started the Great Atlantic & Pacific Tea Company in 1859. Every big city has had, since long before the war, at least two or three local chain grocery systems and usually some drug-store chains, while the five and ten cent stores have been everywhere. The A. & P. spread through all the larger cities of the East, and Woolworth and Kresge were national in their scope, but it was not until the period since 1921 that the wide opposition began to develop, for it is only since then that the great development in the chains has taken place. In 1921 the A. & P., for instance, had less than five thousand stores, while now it has more than seventeen thousand. The small local chains have been merged into large chains. The chain stores are no longer solely a city development; the Main Street of every town is now dotted with them.

The chains had about four per cent of the country's retail sales in 1921, but to-day they are doing approximately twenty per cent. They are in every field. There are now more than four thousand chains operating more than a hundred thousand stores. Of these more than half are grocery stores, but there are more than eleven thousand five and ten cent up to one dollar stores, seven thousand shoe stores, four thousand-odd drug stores, and nearly four thousand cigar stores. There are chain bakeries, automobile supply shops, barber shops, hat shops, restaurants, millinery stores, and so on.

Some of the big chains have branched out into foreign countries. Woolworth is in England, in Germany, and in Cuba. The Walk-Over Shoe Company is in nearly every big city of the world. The Liggett Company, which has many ramifications, controls Boots the Chemists, which has eight hundred units in Great Britain. The A. & P. is in Canada, and some of the other chains have foreign branches.

It is estimated that the chain form of merchandising is doing a yearly business of five billion dollars. It is big business.

The actual objection to the chain store is that it sells its goods at lower prices than the independent merchant. This, of course, is always the objection to any change in the methods of doing business. This is not an objection to which any weight can be given, for business exists to serve the people, and it cannot for long exist unless it performs this service. There is no merit in any plea by which a business seeks the support of the people regardless of the service it renders.

However, it is urged with great vehemence that, although the chain store does serve the community at lower prices than the independent merchant, it does not enter into community activities. It is said to do nothing toward making the towns in which it operates better places in which to live. It is said to pay its employees starvation wages and, instead of building citizens, to create a race of human automatons who only know how to wrap up packages and make change. Further, it is said that the chains are

ruthless in their buying methods—that they frequently lure manufacturers by the size of their orders and, when they have bought the entire output for a time, start gradually to force down prices until they ruin the manufacturer, then either buy his plant or pass on to another victim. It is possible to make out a case against the chain store in which it can be shown that its low prices are not at all what they seem to be and that in the end the public is the loser.

Sentiment and the Opposition

There is also a purely emotional angle to the opposition. Many of the older residents and merchants of the towns who have grown up with and loved their Main Streets do not like to see the old buildings go, only to be replaced by the garish, ugly fronts of chain stores. This sentimental opposition is exceedingly powerful. Men who have worked ardently all their lives to better their towns very naturally do not want to see their handiwork destroyed, and they feel that it is being destroyed.

Since every objection to the chain store can be supported by concrete—although isolated—instances, it is not difficult to see why and how the campaign against them has steadily gained force.

I have been using the expression "chain store" to represent a type of merchandising, and that is the way the phrase is generally used. In the usual conception a chain store is a luridly painted shop that sells, for cash only, a limited line of low-priced commodities or novelties which are delivered to the customer with a minimum of service and attention and which the customer must carry home. The operation of the store unit is supposed to be purely mechanical. The manager and his clerks are not storekeepers at all but merely handlers of what some far-away central office has put on their shelves and counters. In fact, some systems do without the clerks altogether—the customers select their own goods and pay the cashier on the way out.

Growing Into Respectability

Even in some of the merchandising textbooks, low wages and complete central control and buying are given as essentials of the chain store. It is true that in all the earlier chain stores no attention whatsoever was given to the appearance of the store so long as the arrangements permitted the goods to be in the sight of the customer. The buying was all highly centralized, and customers had to follow the cash-and-carry way. The managers and clerks were not required or expected to have more than moron intelligence and were paid at current moron rates.

The chain store, it must be remembered, entered the least efficient field of business activity—retail merchandising. If the smaller merchant can be said to have had any policy, it was to save at the spigot and forget all about the bunghole. Consequently wages have always been low and, generally speaking, are still low. The earlier chain-store proprietors were intent upon doing business cheaply; hence they tried so to arrange their stores that the goods would sell themselves. The emphasis was on price. They carried only cheap stuff and hired only cheap men.

They bought centrally in quantity, and they tried to gain extra profits by buying only such goods as they could sell under their own brands, so that no manufacturer could build up any good will through their sales and use that as an argument to sustain his prices. The quantities that the stores bought were large but not so large that at least a portion of the requirements could not be met by the purchase of distress goods.

It was taken for granted that chain-store goods would be of low quality. It was not quite respectable to be caught buying in a chain store.

These policies worked well enough when the chain store had to compete only with the independent retailer. In a way the stores did not really compete. The five and ten cent stores were not in competition with any others, for they mostly carried articles that the merchants did not want to bother with, while the chain grocery stores caught only the trade of the very poor and then largely on items on which the independent grocer made slight profits. Some of the drug-store chains were fairly large, but their stores were so scattered that there was no general complaint about competition except perhaps in the cities—and there the independent retailers had no one to listen to them.

The Era of Ruthless Competition

It has been only since 1921 that the chain-store systems have really branched out and become a sizable factor in the merchandising of the country. This was due in part to the ability of the chains to save money for their customers during the period of deep depression and in part to the fact that the bull market in securities made it possible to float common and preferred stocks on a favorable basis and to extend operations on this new money. Some of the chains have extended entirely out of profits, but others have extended through stock issues. The merging of small chains gave to the bankers corporations of sufficient size and stability to warrant public offerings.

Since the chains have begun to branch out they have learned a good deal about themselves. More especially, they have discovered that some of the principles which they had thought essential to their methods of doing business were not only not essential but positively against their best interests. Most of this knowledge came out of competition—in part with the independent retailers but more largely with the other chains.

For as the chains spread out they began to go after one another's business in ruthless fashion. This is particularly true of the grocery and of the five and ten cent store chains. If Chain A went into a town, before long Chain B would be along with a store, and soon they would be joined by Chains C and D. To-day it is not unusual in the grocery line to find three or four chains in the same block of a town which could hardly be expected to support more than two such stores.

The owners of real estate were quick to scent this competition and so to run up their rentals that to-day one of the serious problems in chain-store extension is to discover store sites that can be rented at even moderately reasonable figures.

Now the chains are overlapping one another. The grocery stores carry cigarettes and candy, the five and ten cent stores have soda and lunch counters and also carry groceries, and the drug stores carry everything. It is a wise chain that knows its own father.

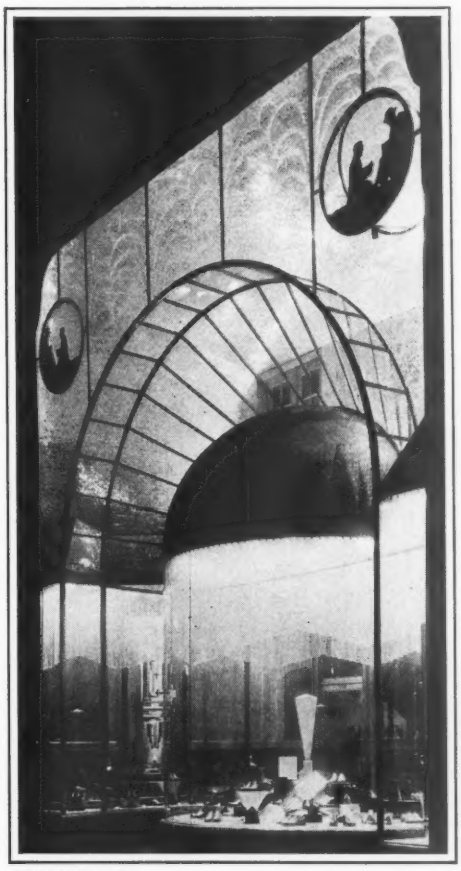
This competition has brought about changes not only in methods, management, and ways of doing business but in the character of the stocks carried and in the attitude toward community responsibility.

The Penney System

To-day the whole character of chains is in such a state of flux that it is difficult to define just what is a chain store. Some of the chains still have price limitations—that is, nothing sold over ten cents or twenty-five cents or even a dollar—but others have no price limitations, and the chain drug stores carry many quite expensive articles.

The grocery stores have changed the character of their stocks and so broadened their appeal that their customers come from all classes and there is no longer even a hint that it is not wholly respectable to trade in them. There is a decided tendency to increase the size of the stores and a very general stepping up in appearance. The old days when the cheapest thing was the best thing have gone.

This has also brought about striking changes in management. One chain store can sell about as cheaply as another, and it quickly became apparent that the personality and skill of the store manager and his clerks are a very large factor in the success of any unit. In short, it paid to have well-trained people earning good salaries.



Ewing Galloway

There is now a chain for almost every line of merchandise. This chain shoe store in New York is in keeping with the trend toward beautifying store architecture.

The leader in this movement was J. C. Penney. He began as a clerk in a general store in Wyoming. The proprietor of that store helped him to set up in business for himself in another town. He proved to be a very successful merchant, and when his store was doing as much business as the town had to offer and he had accumulated a little money he set up his principal clerk in a store in a near-by town, retaining a partnership interest in the new store.

This store in the course of time set up its most competent clerk in another store; and thus grew up a chain of stores in which every manager was a part owner. This has since been replaced by a stock arrangement, but the principle still holds.

And, although the buying and bookkeeping are centralized, the managers select their stocks from the chain buyers just as they would select them if they were independent merchants. The great strength of the chain is that the managers exercise the functions of proprietors, take their places in community life as such, and by constant contact with their communities keep their stores stocked with the kinds of goods that their people want.

In the Safeway stores the managers are practically independent; they buy their stocks from the central buying organization just as they would from a jobber. The Kresge stores pay their managers and clerks very well—and most of them also have stock interests. Not only do these managers enter into all community activities, but the company itself is a very large contributor to all worthy community activities. All the more progressive chains now give their people rigorous courses in retail merchandising, pay them well, and are trying to get away from the old impersonal chain-store character. In fact, most chain-store managers now earn more than would an independent merchant in a store of similar size.

Expert Advice

On the whole, man for man, the average chain-store manager is a better storekeeper than the average independent. This he can easily be because he has certain great advantages over the independent. For one thing, he does not have to bother about finances. Also he does not have to bother about the prices of the goods that he stocks. For those goods will have been bought centrally, and he knows that the prices and the qualities have been settled by expert buyers. An independent merchant may be a very skilled buyer in some lines, but he cannot be a skilled buyer in all the lines that his store carries. A certain proportion of his stock he will not buy at all; it will be sold to him.

In addition to all this, the chain-store manager has available to him the best methods of cost accounting, so that he can know what he is doing, and in his sales methods he has at hand the collective experience of the whole chain. All these advantages revert to the benefit of the customer.

One of the great difficulties of retail merchandising has been its lack of coördination with manufacturing. In the old days a merchant bought from salesmen or went to the central markets two or three times a year and laid in what he thought he could sell. If at the time of buying prices were high and they subsequently dropped, then he suffered a very heavy loss.

But, even if there were no violent price changes, he had not only to estimate the buying power of his customers well in advance but also to preserve a balance between what the wholesalers most wanted to

sell him and what he thought his own customers would buy.

Since he bought infrequently, he had to carry large stocks and thus maintain a heavy investment. A part of this investment was always frozen in goods that would not move from the shelves.

Hand-to-Mouth Buying

These buying practices were not good for the manufacturers—although they thought they were, largely because they had never known any other kind. The concentrating of purchases in spring and fall disturbed their schedules of production, made their activities highly seasonal, and therefore increased the cost of manufacturing. In addition, this seasonal work was very hard on labor. The year 1920 saw the last of forward buying, for then the retailers found themselves with great stocks of high-priced goods that no one wanted to buy. Many of them were ruined.

The retailers thereafter, because of their finances, had to buy in small quantities; and this, they learned, was an advantage.

Thus arose the present practice of hand-to-mouth buying. In this the manufacturer holds the bag unless he can very skillfully estimate probable buying and arrange his schedules accordingly.

The chain store, however, can very closely estimate its business. It has at hand a mass of data from which can be estimated with great accuracy the quantity of any article that can be sold at a certain price. It can therefore plan well ahead and place its orders so that it can get a minimum price; and at the same time the manufacturer, through regularized production, can make a profit. The chain store affords the best link we know between production and distribution.

This is a very important factor in stabilizing employment and therefore in preserving that very great consumer buying power which arises from the steady payment of wages.

However, this phase of chain-store operation is just beginning to be realized. A number of chain stores believed that by owning factories they could save the manufacturing profit. They failed to grasp that manufacturing and distribution are very different fields, requiring different kinds of ability in management.

They have nearly all learned this now, for their experiences in manufacturing have been most disastrous, and at the best, of course, no chain could make more than a few of the many articles which it has to offer for sale.

The Sources of Supply

The other practice that has delayed a closer tie-up between manufacturing and distribution has been over-sharp buying. The chain stores buy for cash, and when they were smaller they could use the power of cash to force down prices regardless of the manufacturer's profit. If one manufacturer ruined himself by a bad bargain it was just too bad—but there were other manufacturers ready to come up and try the same thing.

That sort of buying was well enough for the small chains, but as the quantities required grew larger it began to dawn upon buyers that unless they preserved their sources of supply they would have nothing to sell. And so to-day it is of vital interest to every great chain organization to keep its sources of supply open and prosperous. If a manufacturer capable of turning out a product the public will buy is not also a good financier, then the larger and more progressive chains will help him out with business experts, with cost accountants, and with money.

The big chains cannot buy distress goods because there is never enough of them on the market, and they cannot buy poor stuff because then they would lose their business to the chains who buy good stuff. Only in the drug field do the chains manufacture at all extensively.

What of the Small Merchant?

Then too, all of them have been compelled to meet the tastes of customers by carrying advertised brands as well as their own brands. Indeed, many of the grocery chains no longer pay much attention to having their own brands. The chain is gradually finding its rightful place as a complement to manufacturing.

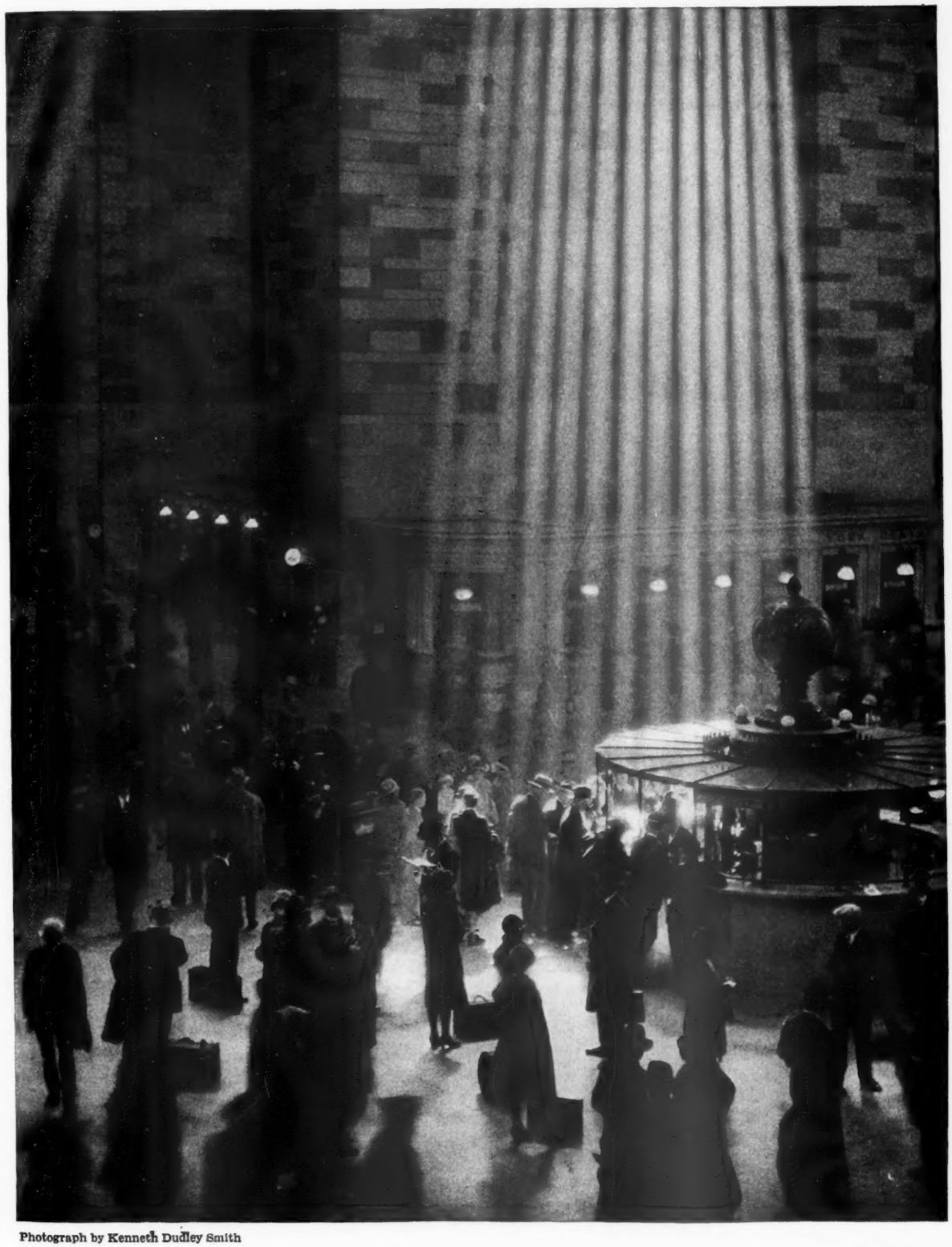
Does this progression of the chains, however, mean that the small merchant is going to be forced out of business? The inefficient merchant is a menace to business in that in the end he fails and the community must indirectly pay his debts. By no means all the chain-store units that are opened prove to be successful, but when one of them is closed only the chain-store organization loses.

That, however, is a detail—although an important one. The main point is that the merchant with a small buying power cannot compete with the chain in the mass distribution of staple commodities. The chain store must have a rapid turnover of goods, so that it can do a large volume of business on a small capital investment. That is the chain-store principle, and this very principle restricts the field of its activities to such articles as people will buy in large quantities. It cannot deal in specialties—high-priced or otherwise—for which there is only a limited demand. It cannot beyond a certain point give personal service.

Where Personal Service Counts

The conditions of chain service limit its field, but at the same time they open the field for the independent merchant who can deal in specialties for which the demand is limited and where personal service and not price is the chief sales factor. And this, with the country's buying power and population constantly increasing, is a very large field indeed.

The independent retail stores come and go, as they always have. But oddly enough, more come in than go out. The number of independent retailers—notably grocers—is increasing. That, however, is not wholly a healthful sign. For we need stronger independent units; not simply more of them. If the chain competition sifts out the weaker stores, the whole of retail merchandising will be benefited.



Photograph by Kenneth Dudley Smith

GRAND CENTRAL

LAST MARCH World's Work published a photograph of the Pennsylvania Station, New York. The above view of the other great Manhattan terminal, the Grand Central (completed in 1913), is equally interesting and, like the March picture, records an unusual sunlight effect.

It is estimated that more than sixty-eight million people used the terminal in 1929, of whom forty-seven million were passengers. The remaining twenty-one millions used it as a thoroughfare to the surrounding office buildings, hotels, and streets, or to meet and bid good-bye to passengers.

Death Valley's Road to Nowhere

THERE it stretched, this weird valley of death—grim, unconquered, defying man and his genius, only three hundred miles from Los Angeles and less than a hundred from the thriving little town of Lone Pine in Inyo County, California. Yet this valley, the sink of America, two hundred and seventy-six feet below sea level, hemmed in by impregnable mountain barriers, remained as inaccessible as the unexplored wastes of Siberia.

Silent as death itself, Death Valley was the sphinx of California, the most talked-of but the least known valley in the West. It was given its ghastly name by the miserable little band of jayhawkers who traversed its parched wastes in 1849 and escaped through Townsend Pass. Behind them they left many of their number, victims of thirst, hunger, and lying mirages. Until recently it has remained true to its name.

Parched Throats, Swollen Tongues

But a hundred and ten miles in length, and from six to ten in width, in its mountain fastnesses were locked treasure chests of gold and silver of fabulous worth, yet no highway led in or out. To those who found the gold it turned into the mockery of Midas. A canteen of water to moisten a swollen tongue. A crumb of hardtack to relieve a gnawing stomach. A bleaching skeleton. An arm bone flung over a rotted sack full of nuggets. The fingers of a hand clenched over a yellowed bit of paper. An almost illegible scrawl: "Died rich, by God," and a trailing signature, "John Green." Such was the irony of Death Valley.

"I saw the valley for the first time in 1906," said H. W. Eichbaum when I talked to him as we sat in the luxurious lobby of Stove Pipe Wells, the modern hotel he has built on the sand dunes of Death Valley. "Like everyone else, I thought the tales I had heard of the terrors of the place greatly exaggerated. Never had I seen a more beautiful valley than that which stretched before me. But I soon learned to respect the alkaline waste as much as the old-timers before me. Yet I never lost my admiration for its beauty."

Eichbaum prospected all through the Gold Belt and the Ubehebe country. During that first year of exploration he acquired several valuable properties, among them some big copper claims. He turned a few good deals and soon was rated as one of the rich men of the district. But he was not satisfied. For months at a time he would go out into the hidden canyons where no white man had ever set foot, his only companion a pack animal. As the purple shadows of the desert lengthened and he watched the fiery pyrotechnical display of the sunsets, always there came the challenge of Nature to man.

Smoking his pipe in the solitudes, he could see visions of the past and the future—the covered wagons of the pioneers, creaking mournfully across the trackless waste; prospectors with their burros, their farseeing eyes blind to the scenic wonders about them.

By ALMA OVERHOLT

In Death Valley, California, where more than a score of "Forty-niners" perished from starvation, thirst, and exposure, a hardy engineer has now built a beautiful hotel and a good road, made fresh water flow, and started mining operations. One of the most colorful sections of the country, its "return" to civilization from the land of the dead was made possible by grit and vision combined.

Always the procession was from east to west. He wanted to reverse the line. From out of the West, through those mountains from behind which the Argonauts saw the snow-tipped Sierras, he wanted to see a new caravan wend its way, one that would make the silent valley the playground of man instead of a death trap.

The lure of gold gave way to the fascination of achievement. The solution of the engineering problem that would break the jaws of Death Valley became to Eichbaum more important than all the gold mines hidden in its treacherous canyons. But always when he mentioned a road into Death Valley, the desert men laughed.

Old-Timers Who Scoffed at a Dream

"You will want to build a hotel in there next. And have dances mebbe. And bathing beauties sunning theirselves on the sand."

These men of the border town liked Eichbaum, but to them he was a dreamer. He was made of different clay than the weather-beaten prospectors to whom the camp life and mesquite are home. He understood their language, lived their life, and shared their hardships. He was one of them, but they could not understand him.

"If Eichbaum means to do a thing he'll do it, and there ain't nothin' goin' to stop him," became the opinion among the prospectors when they gathered

round the fires out on the desert floor or in the pool rooms of the border towns.

"And I'll stick by him till hell freezes over, no matter what he aims to do," would invariably come from someone round the circle.

Eichbaum was a square shooter. That was what counted. He has staked many a man who was in need of grub. If a claim didn't pan out and the "lost mine" that old Rocky Mountain George or Panamint Slim was sure was right over in "them thar hills" didn't materialize, Eichbaum merely smiled.

"Better luck next time pardner," would be his only comment.

Stove Pipe Wells

A man who goes month after month alone into Death Valley knows no fear. The courage of such a man no one could question. And no man, even with wits dulled by bad liquor, ever felt foolhardy enough to try to pick a quarrel with Eichbaum.

"If you think you can kick down a mountain and build a road through from California, why the more power to you," said Death Valley Scotty, who had a rancho up in the northern end of the Valley. Scotty and Eichbaum have been fast friends since the days when the picturesque desert character was a partner of Buffalo Bill—William F. Cody—in his Wild West shows.

Then there was Johnny Cytye, known as "Two-Gun Johnny" or "Johnny-Behind-the-Gun," who was one of the few men who ventured into Death Valley periodically. He had for twenty-two years made it his duty to see that a shovel remained at the water hole of Stove Pipe Wells.

"Better head for Stove Pipe when you cross Townsend Pass," suggested Johnny. "That's the way the Indians used to go. It's the only place you will find water after leaving Darwin Wash."

So Eichbaum held to his dream and one day petitioned the supervisors of Inyo County for the right to build a road into the Valley.

Two-Gun Johnny Cytye, who was not afraid to go into the valley as self-appointed caretaker of Stove Pipe's water hole.

"Who the hell wants to build a road to nowhere?" these men asked as they blinked their eyes in unbelief when the petition came before them.

"I do," quietly spoke up Eichbaum from a back seat in the room.

A Road at Last

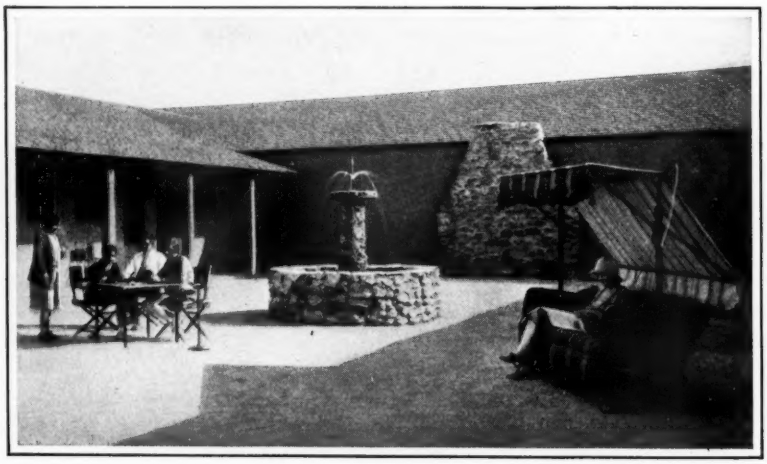
Just one month from the day the franchise was granted, Eichbaum had a tractor on its way through the Panamint Mountains. Equipment was trucked in for three hundred miles from Los Angeles. Mud and washouts often held up supplies and machinery for weeks at a time. Camps were established at strategic points and wagons kept on the trail day and night to haul water from Emigrant Springs to the crews working on the Death Valley side of the Panamints and from Darwin to those on the western side.

The barrels ran dry and there was a panic in camp. Two surveyors gave up their jobs. One lost his horse and when found wandering in the desert was delirious. A posse was sent out to find the other. There were many near casualties. But Eichbaum knew his Death Valley and how to safeguard his road crews.

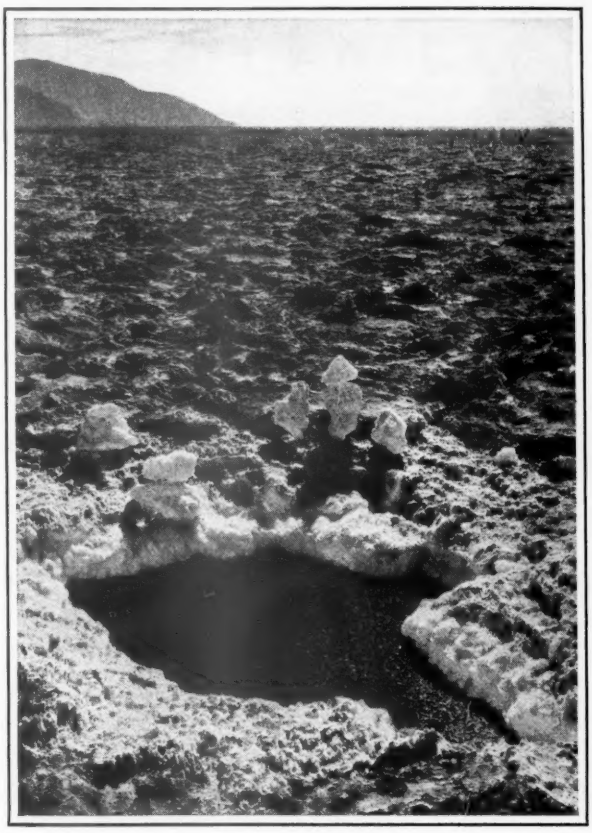
"The gigantic scope of the gamble fascinated me," he explained. "Death Valley had wealth enough to pay odds of a million to one if the road went through.

"Up in the Gold Belt region in the northern end I owned abandoned properties in which gold assays ran from $600 to $10,000 to the ton. It was impossible to get the ore out without a road. I knew of many other good properties. And this gold was still luring men into the Valley and claiming more and more lives. Old-timers who knew both the futility and the danger of going in still were determined to try it 'just once more.'

"I remember when I was sitting in Rhyolite one winter, the boys said, 'Shorty Harris is back up in Marble



The patio of Stove Pipe Wells. Fresh water now bubbles from the fountain where before there was only sand, desolation, burning heat, and aridness. Eighty miles distant is the highest point in the States, Mt. Whitney, 14,502 feet above sea level.



The Salt Pool in the Devil's Golf Course in the most dangerous and barren part of Death Valley. There is surface water in this dried-up sea bed, but it is salt. The valley floor, the lowest point on this continent, is two hundred and seventy-six feet below sea level; and here in the summer, the mercury goes above a hundred and thirty degrees.

Canyon prospecting. Panamint Slim is packing water out to him. What if he does find a bonanza? He can't carry it out.'

"Nobody could. The richest mine was not worth a canteen of good water. Only a road could give the boys a chance to cash in on their years of hardship, of suffering, and of weary wandering in the Valley. And somebody had to build it. I was an engineer. I knew the Valley, and fortunately I had the capital."

The First Drink in Centuries

The building of the road was, however, only the beginning of Mr. Eichbaum's campaign to break the jaws of Death Valley. As the road neared completion, work was begun on the building of a bungalow city. Several rows of one-room bungalows were erected to house overnight guests. Wall board and lumber were trucked in from Los Angeles over the new road. Next came an administration building, then the hotel.

But most important was the securing of an adequate water supply. Eichbaum, through his knowledge of live streams of the desert that flow underground, felt that somewhere near Stove Pipe he would be able to tap an underground spring. He dug five dry holes, but on his sixth attempt, at a depth of only sixty feet, he struck a natural flow of good water. Most of the water in Death Valley is brackish, and some streams are poisonous. With a pumping plant installed, one thousand gallons of pure water are now being pumped from this well an hour. It was strange sight to the desert men to see the water flowing over the floor of a valley that was having its first drink in centuries.

Eichbaum keeps a crew at Stove Pipe all through the burning summer, to care for travelers who may venture into the desert during the closed season and get into trouble. Death Valley is delightful from October to May, when the temperature averages around sixty-eight degrees. After that the mercury starts on its altitude record and goes as high as 138°.

"I would not have someone come in here during the dangerous time of year and not be able to get aid," said he in explaining his motive for keeping Stove Pipe open although very definitely advertised as shut during the summer. "There is always someone who is misinformed or who believes that the Desert can be safely traveled despite the heat."

An emergency truck, filled canteens, blankets, food supplies, and cans of gasoline are always in readiness to be sent out in answer to a signal fire for help or the blinking of an automobile headlight. The summer of 1927 was the first time that any man remained in Death Valley during all July and August.

The man whom Mr. Eichbaum made responsible for guarding the safety of those who might come tnrough Deatn Valley that first summer was John Welland, a seventy-year-old prospector. John dug a cellar and turned the water on around the outside to keep it cool. There were several emergency calls that summer, and probably more than a dozen persons owe their lives to the foresightedness of Mr. Eichbaum and the fact that John Welland kept his trust.

Will the Gamble Pan Out?

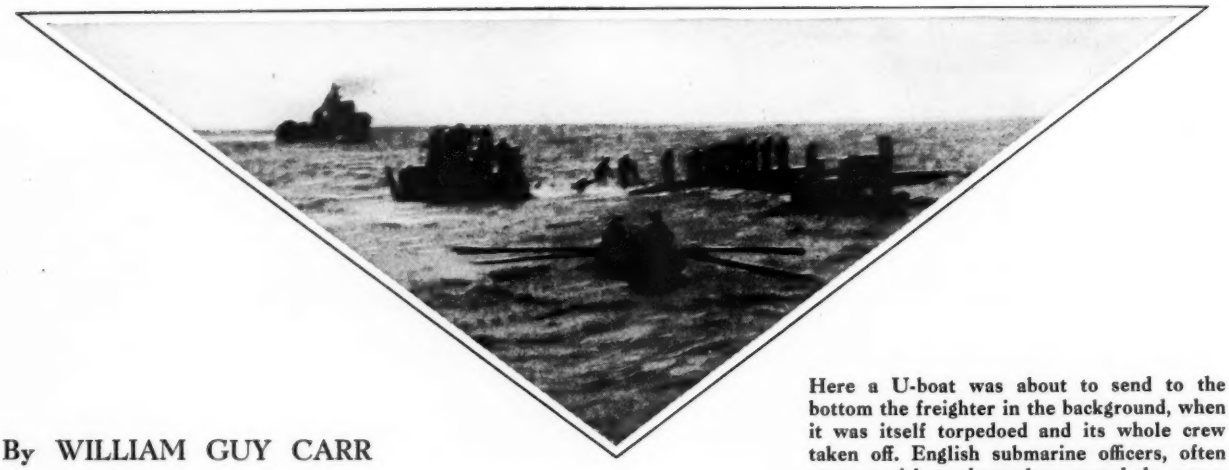
"Is Death Valley paying you that million to one shot?" I asked, with the feeling that the resort and the road were not the only things that this quiet man was developing in his plans.

"Not yet, but it is going to," he smiled. Then I learned of the labor of love performed by his partners in the desert.

In the heat of last August, Bill Corcoran, Shorty Harris, Jack Stewart, and a number of other old prospectors built a road three miles up a sheer mountainside from Emigrant Springs to a mine. thought to be the Lost Dutchman, which Eichbaum now owns. The mine was originally believed to have belonged to two German prospectors who had to abandon it when their water ran out. The new strike is heralded as the richest since that of Harrisburg in 1905. Assays taken run as high as $10,000 per ton.

The thermometer hovered round the usual 128° and higher. Despite the terrific heat the men completed the road in twenty days. They didn't want their "pardner" to lose any more time cashing in on his share of Death Valley. And in the mines lies the ultimate success of the gamble. The first moves have been won by Eichbaum; he is confident that the final victory will be with him too.

Tin Fish and Depth Charges



Here a U-boat was about to send to the bottom the freighter in the background, when it was itself torpedoed and its whole crew taken off. English submarine officers, often at great risk to themselves, saved the crews of many enemy vessels that they had sunk.

By WILLIAM GUY CARR

Imperial War Museum Photographs

THROUGHOUT the prolonged drama of the World War, submarines appeared on stage only as sole performers. The records of neither the British nor the German underwater service tell of successful mass actions on the part of the craft that kept out of sight.

By its very nature the submarine was predestined to do its best work alone. Where other engines of destruction—airplanes, tanks, surface ships—found strength in numbers, submarines found only weakness. Their only asset a precarious invisibility, two boats had less chance of preserving that invisibility than one, and four less than two.

So it was that the story of the British submarine service was one of monotonous patrols, enlivened by too-rare bouts with the enemy. Of the nature of the patrols, enough has already been said in the preceding articles of this series. Of the adventures none seemed so exciting or were so eagerly sought as those involving enemy craft of the same sinister breed.

During the period of hostilities, British submarine commanders sunk eighteen enemy U-boats and lost to enemy U-boats five of their own. Early in the war, before the mystery ships or Q-boats were thought of and before the deadly depth charge was invented, our entire submarine fleet was disposed to operate principally against enemy U-boats. If the destroyers were the traffic police of the sea routes about the British Isles, the submarines were the plain-clothes men bent on locating the hidden raiders from across the channel.

An official report reads: "Lieut. A. W. Forbes, in C-7, sighted a large U-boat on his port quarter at 3:32 A.M. It was dark and misty at the time. He immediately attacked on the surface and sank her with a single shot at 250 yards' range."

Having had similar experiences—which did not, however, turn out so successfully—let me try to picture the sort of thing that happened:

Imagine a dismal April night. A dank Scotch mist is over everything, the sea is a lake of ink, and the heavens hang so low that you feel you can reach up and touch them. A night dank and weird and as dark as the inside of a cow. It is the stretch twixt midnight and four A. M., known to all as the graveyard watch—the time when life is at its lowest ebb and when ailing people release their hold on life to slip out into the unknown.

The boat was lying there on the surface as quiet as a sleeping whale. Peering at the surrounding blackness, the men on deck sighted another submarine, hardly discernible against the background of the night. Doubt immediately assailed the officer on watch. Was she friend or foe? There was no way to tell. Perhaps other British boats were expected to rendezvous there and await the sweepers that would clear a way for them into the harbor.

When Eyes and Nerves Were Strained

The officer on watch called the captain, and together they studied the low, dark form through their night glasses. They dared not challenge, for were she an enemy boat she would dive or sink them the moment she saw the signal. The officers continued to stare through the glasses until their eyes were strained and their imaginations ran riot. Then, perhaps, they ordered the motors ahead ever so gently, that they might kick the boat closer to the dark shape across the water.

Every nerve was strained. They prayed for light—and the night seemed to grow darker. The blackness seemed to weigh down on them like a wet blanket. A cloud of mist drifted by, and they lost sight of the other boat altogether. Then she appeared again, a black shadow against black, from beneath the shroud of mist that hid her. Again eyes strained through the night glasses. Then the moment of decision came. The two officers agreed that the other vessel was a Fritz; they pointed out to each other her peculiarities. Their boat was eased around to bring her tubes to

There is no more thrilling chapter in the war exploits of the British navy than that written by the submarines which combed the North Sea in search of German U-boats—an endless watch made doubly hazardous by hidden mines. One death grapple was fought to a dramatic finish far beneath the surface; this and other sinister encounters in a grim game of hide and seek are told for the first time.

bear. They waited in suspense until the bow stopped swinging, wondering if those on the other boat were aware of their presence.

Then the captain spoke the command quietly down the voice tube: "Fire."

A startled cry might have floated across the comparatively short distance between the boats as the lookout on the German craft sighted the phosphorescent trail of the tin fish racing toward them. Then came a dull, heavy BOOM, a blinding flash burst against the blackness, the torpedoes in the other boat exploded, adding further chaos, and there followed a moment of deathlike silence until the débris began to fall spashing into the water all around them.

Such was the actual experience of Lieut. P. Philips when in command of E-52. He sent U-63 to the bottom: one petty officer was the sole survivor.

Until All Sounds Had Died

To me, the greatest story of underseas warfare was that of E-50 and her underwater duel with a German submarine. She was on patrol when one of the crew heard what he thought were sounds of another submarine's motors. Just then the officer keeping the periscope watch sighted another periscope. One quick glance told him that it differed in appearance from those used by our boats. Taking the periscope tip as his mark, he fired the bow torpedoes but failed to secure a hit. He charged the other boat, and a collision followed.

What came after was like a fight to the death between two monsters of the deep. The stem of the E-boat had bitten in the U-boat's hull. The hydroplanes of the British boat were jammed tight. The men stood silently watching their commanding officer and wondering what he intended to do.

The action of the enemy made up his mind for him. In a silence like that of a tomb the crew of the E-boat heard the sounds made by the crew of the other boat. They could hear the Germans frantically blowing their tanks. They were trying to get to the surface.

"Must be more damaged than us," was the matter-of-fact remark of the British commander. "He must be leaking. He seems damned anxious to get top-side. Flood all tanks—we'll keep him down."

While the German crew blew their tanks and tried to pump water out of the flooded compartments, the E-boat filled hers to counteract the other's buoyancy. They held the U-boat down under until all sounds had died.

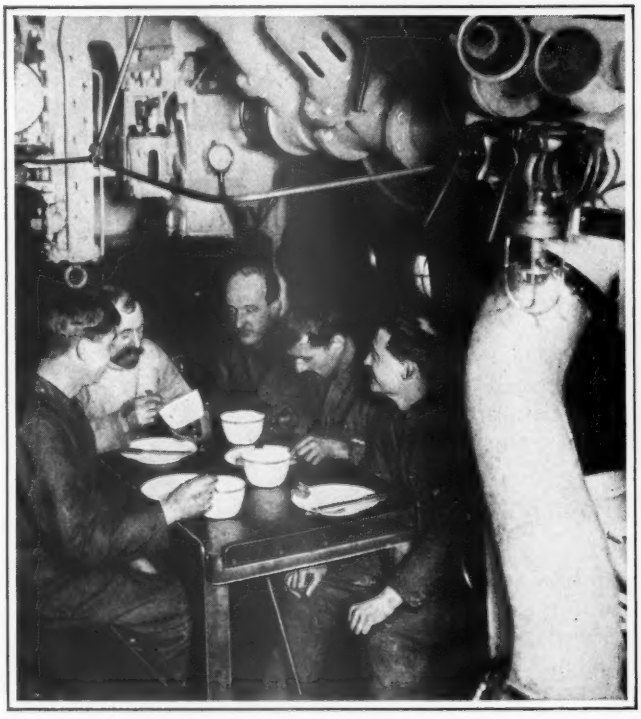
Suddenly those in the British boat felt the enemy vessel break loose. They felt her drag along the side, bumping as she drifted astern. E-50, with jammed hydroplanes and heavy with negative buoyancy, started down for the ocean's bed alone.

For four anxious moments her crew struggled to make her rise. At last they succeeded, and she shot to the surface as the last of the water was forced from her tanks. On her quarter was the conning tower of her adversary, listed crazily to port. The German submarine seemed to be heavily down by the bow and was sinking fast. Soon nothing was seen save a rapidly increasing area covered with oil that came seeping up from the depths below.

No other episode of the war could seem so horrible. When planes rammed each other, both crashed to earth in a few seconds; in a submarine, the death agony was longer.

Lieutenant Bradshaw, D.S.O., commanding G-13, made what can be called the luckiest shot of the war. He sank an enemy submarine at a range estimated as seven thousand yards. It was generally believed that his kill was the famous Bremen, sister ship to the Deutschland, which journeyed across the Atlantic to New York.

Bradshaw sighted the submarine while doing a submerged patrol. He maneuvered, then fired his two bow torpedoes but missed with both. He put his helm over, brought his starboard tube to bear, and, allowing a little more deflection, fired again. Again there was no result. He maneuvered his beam tube to bear and, with a prayer, fired once more. Already he had wasted about eighteen thousand dollars' worth of torpedoes. The expected explosion never materialized.



Not quite the same as at home. Even on patrol, in the dangerous waters of the North Sea, always under the threat of a sudden attack, the English crews had afternoon tea served daily.

What the members of a submarine crew looked like after weeks on patrol duty. These men were very carefully chosen. It was a great honor to be aboard a submarine. This man is watching his mates take off the crew of a trading vessel which the submarine has cornered, preparatory to sinking.

Believing that he might as well be killed for a sheep as a lamb when he reported home, he turned his stern to the fast-disappearing U-boat and let go the 21-inch torpedo. To the surprise of all on board, the explosion was felt at the proper interval.

While the Admiralty at first inclined to the belief that a mine and not the torpedo had exploded, Bradshaw was later credited with the hit and, I believe, decorated for it.

A Rendezvous—With Death

Lieut. D'Oyly Hughes, who had served with Nasmith in the Dardanelles, had an extraordinary experience while in command of E-35. He torpedoed and sank a U-boat after an attack which lasted for two hours and a half. When he came to the surface to rescue the survivors he was nearly torpedoed himself by another U-boat. The first boat was evidently waiting to keep a rendezvous with the second, for she had patrolled up and down on the surface the whole two hours and a half.

When Hughes first spotted his victim through his periscope, he changed course to head the enemy boat off. Coming up for a look, he discovered that she had changed course and was off in another direction. He set off after her again, only to have exactly the same thing happen. In this way he nearly used up all the juice in his batteries. He was about to give up the chase as a bad job, when the U-boat turned about and came toward him on a course that well-nigh made a miss impossible. Hughes took no chances, however, and fired two torpedoes. Both hit.

The second U-boat must have heard the explosion too. As E-35 rose from the depths and her coxswain, first lieutenant, and an able seamen prepared to fish the four or five survivors out of the water, the other Fritz appeared. Hughes dived to attack at once, as was his duty. It was lucky that he did so, for no sooner was the British boat submerged than the crew distinctly heard a torpedo pass above them.

A moment's delay, and E-35 would have joined her victim on the ocean's floor.

Dangerous Hunting Grounds

One German submarine owed its sinking to the fact that the monotony of a patrol off Helgoland became too much for the youthful commander of H-5. Lieutenant Varley's attack, in some ways, stands out above all others.

Bored with inaction, anxious to come to grips with the enemy, Varley sneaked away from his patrol position without permission and wandered into the enemy's front garden. He reasoned that if successful he would be forgiven and that if he were sunk it wouldn't matter anyway. So one fine day in July, 1916, he set out for the mouth of the Ems.

He arrived at his hunting grounds at two A. M. and dived off Borkum. After waiting there fruitlessly throughout one day, he moved from the front garden into the vestibule. Before dawn H-5 was submerged off Wangeroog Light. Good hunting grounds—but nothing showed up to break the monotony of another day of waiting. Toward night he shifted his position, so that he might better charge his batteries without interference. About ten P.M., near the Aussen Jade Lightship, trouble came in the shape of a flotilla of enemy destroyers. The night was light, and Varley attacked the flotilla without success.

Everything was going wrong. During the preceding day the periscope had become stiff to turn. Instead of moving with the jewel-like movement of a watch, it turned more like the capstan on an old sailing ship. While on the surface he and a couple of men tried to fix it. They were busy fixing it when the destroyers came along and tried to fix him. They were forced to make a crash dive and lost all their tools in the bargain. Varley wondered what he would say in his report to explain the loss of the tools.

Varley's thoughts were far from happy, when the officer at the periscope at ten A. M. reported sighting an enemy submarine. Here was their chance! An enemy submarine was considered as important as an enemy battleship any day.

The sea was rather rough, the water in the channel narrow. Depth keeping was difficult, and to make matters worse, it took two men besides himself to move the periscope. These difficulties notwithstanding, Varley blew the U-boat skyward just as she was entering her own harbor. Then he felt it essential that he

take back with him some tangible proof of his success, because now he had to explain why he was short one torpedo. There was the added thought that a prisoner might help appease the wrath of the Brass Hats when he reported that he had left his patrol position.

Varley rose to the surface and headed for some of the U-boat's crew, who were swimming in the water. The destroyers and patrol boats took exception to this piece of impudence, opened fire, and forced H-5 to to dive before she could smuggle aboard a single prisoner.

They carried their animosity further. All day they kept her under and swept for her. Then they gave her crew a lively session by dropping depth charges all around her but without registering a hit. In his report, Varley noted: "I did not consider it advisable to attack the destroyers because of the stiffness of my periscope."

None of the crew of H-5 was hanged, drawn, or quartered for the terrible breach of discipline, but it was more than a year before their lordships condoned the daring exploit by decorating Varley and the crew who welcomed danger but could not support boredom.

Of absurd incidents, there was the adventure of S-1, commanded by Lieut.-Commander Kellett. The S-class boats were a misfit in every way. According to the officers who manned them, they were everything a submarine ought not to be. On a patrol in June, 1915, S-1's port engine broke down. Kept under by a Zeppelin and a Parseval, the crew worked all day trying to repair the damage.

The following day the starboard engine went bad. Sweating and swearing, the crew worked through another day, submerged, trying to coax a spark of life from the dead machinery. Only those who have tried to do heavy work inside a submarine when submerged can realize what the ordeal was like.

The damaged engines refused to respond. The fourth day of patrol found S-1 with her batteries run down and no way of recharging them. Kellett would have been quite justified in surrendering, since he was in enemy waters and surrounded by aircraft and patrols. He might have done so had he not seen the humor rather than the helplessness of his position. There came an interval when the sea was calm and empty save for one lone trawler. With the last of the precious juice, Kellett coaxed S-1 in her direction.

And Not a Shot was Fired

He came to the surface close on her beam and, manning his gun, demanded her surrender. He got it without firing a shot.

A prize crew was put aboard the trawler, which started for Yarmouth with the submarine in tow and keeping the other vessel's crew in control with the threat of her forward gun. But Kellett had not yet plumbed the full humor of the situation. The next day, a Friday, the German trawler's engines broke down. S-1 laid alongside, and the crew set to work. They had to refit pistons, crossheads, and crankhead bearings. After they had finished, the best speed they could get out of the old ruin was four knots, and they were not yet clear of the Bight. On Saturday one of the trawler's cylinders went on the blink. They had to stop again, and the crew cursed and worked some more.

But they actually managed to reach Yarmouth in tow of their prize on the Monday.

One of the finest feats in the annals of submarines was performed by a Canadian, Lieut.-Commander B. L. Johnson, when he brought H-8 safely into Harwich after she had struck a mine. The extraordinary thing was that Johnson was not a highly trained submarine officer. He was in the British merchant service before the war and was appointed to bring H-8 over from Halifax. H-8 was constructed in Canada and made her way across the Atlantic long before the Deutschland was heard of.

An English destroyer dropping a depth charge. Many authorities on naval warfare declare that the perfection, late in the war, of the depth charge and of the depth bomb dropped from an attacking airplane ended the effectiveness of the submarine as a powerful weapon of attack or defense.

Lieut.-Commander Johnson recruited and trained his own crew of Canadian and Scotch sailors, and so well did they perform that when they arrived at Harwich he was allowed to retain his command and take H-8 on active service.

She was patrolling off Amelander Gat in March, 1916, when those inside—they were sixty feet under the surface at the time—heard a slight scraping noise forward. Hardly had they heard the weird sound than the boat rocked under the influence of a terrific explosion. The submarine sank by the bows and hit bottom, at an angle of some thirty degrees, in eighty-five feet of water.

She had struck a mine. When it exploded both forward hydroplanes and the bow caps protecting the torpedo tubes were blown off, the torpedo tubes themselves were wrecked, and the hull was badly damaged. Number one tank was ripped wide open.

Johnston's report of the affair was exceedingly brief: "The forward bulkhead, although leaking, happened to hold. The watertight doors were closed. The motors were put full astern, and numbers two and three ballast tanks were blown. Number one tank was found to be open to the sea. The submarine then came to the surface. After blowing some fuel and making temporary repairs, course was shaped for Terschelling and then Harwich."

A simple, bald statement of what was nothing short of a prodigious feat of seamanship.

What Happened to Brown

Of the other side of the picture—the experiences of those boats which did not limp back to port—we knew nothing; but from accidents to our own boats in home waters we were able to conjecture a great deal.

There were some remarkable escapes, none more remarkable than that of Petty Officer William Brown, one of the crew of a submarine which was sunk off Harwich while engaged in torpedo practice with another submarine as the target. The attacking officer delayed too long before raising his periscope and was within fifty yards of the target submarine before he realized his position. The submerged submarine had her conning tower badly damaged, but this in no way affected her seaworthiness. The target submarine, however, was holed below the water line and began to fill and sink.

The captain of the sinking submarine ordered all hands on deck. Petty Officer Brown and two other men never received the order and went down with the boat. The conning-tower hatch was open when the boat sank.

Trapped for an Hour and a Half

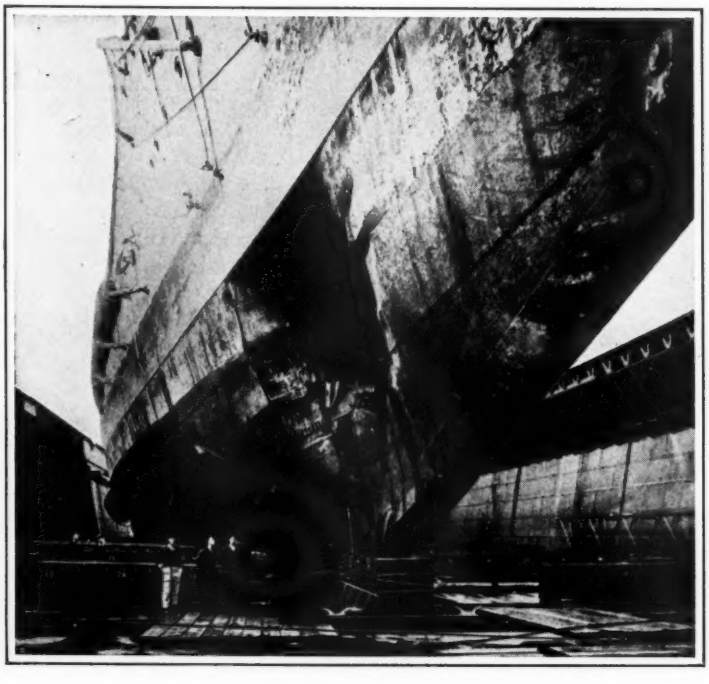
When the boat hit bottom the two other men found themselves in a pocket of air. They waited for a second or two, sized up the situation, and then, realizing that a faint gleam of light they saw ahead was probably from the conning-tower hatch, they each took a deep breath and dived in the direction of the light. They made the conning-tower ladder, saw the lights above them, pulled themselves upward clear of the hatch, and reached the surface, to the intense surprise of the crews of the rescue vessels which had been summoned the moment the accident occurred.

Petty Officer William Brown was the only one missing. Space does not permit quoting Brown's astonishing story in detail. Briefly, what happened was this: Having gone down with his boat, Brown made a search to see if any others were still on board. Finding no one, he closed the engine-room door and began to unscrew the clips of the torpedo hatch over his head. The outside pressure was such that the hatch was jammed down tight and could not have been opened by human strength.

The only thing Brown could do was to wait until the water flooding into the engine-room compartment through the voice pipes rose to a sufficient depth to equalize the pressure in the compartment with that outside the hull.

He was working in darkness, in electrically charged water up to his middle, and was choking with the fumes of chlorine gas which trickled in through the voice pipes leading from the control room. The hatch he was trying to open was a heavy one. It was overhead and in an awkward position to work at.

Let Brown's own story tell the rest: "The heat was at this time excessive; therefore I rested awhile and considered the best way of flooding the engine room.



The German cruiser Moltke in drydock as a result of the good aim of Commander N. F. Laurence. Only the remarkably fine construction of this ship saved her from the bottom. After this encounter in the Baltic, the Czar sent for Laurence and personally thanked him for saving the town of Riga. The torpedo that did the damage was fired in a fog and a choppy sea.

I eventually decided to flood it through the stern tube, or by the weed trap of the circulating system, or by dropping the exhaust and induction valves and opening the muffler valves. I tried the stern tube first but could neither open the stern cap nor the rear door.

"Then I came for'ard again. Whilst passing the switchboards I received several shocks. I tried to open the weed trap, but it was in an awkward position, and as the water was coming over the top of me I could not ease back the butterfly nuts. So I proceeded for'ard again and opened the muffler valve, also the test cocks on the group exhaust valves. I tried them and found the water coming in.

"I then climbed on top of the engines underneath the torpedo hatch and unshipped the strong-back, drawing the pin out of the link with the spanner I had with me. In order to flood the boat completely I opened the scuttle in the engine-room bulkhead.

"Chlorine gas was coming in as well as water. I tried three times to lift the hatch but each time could only open it halfway; and each time air rushed out through it and the hatch fell down again. I clipped the hatch again and had to dive down to fetch up the clip bolts. Then, as the pressure increased again, I knocked off the clip bolts.

"The hatch flew open—but not enough to let me out. I managed to lift it sufficiently to clear my hand and let it down again. I then decided to flood the boat rapidly through the dead light and was then able to raise the hatch and come to the surface."

It was an hour and a half from the time the submarine sank until the crew of the destroyer which was marking the spot suddenly saw a man come bobbing, like a cork, to the surface. He was wearing an air belt and had a badly crushed hand. He appeared all in, but he wasn't.

As soon as he was fished out of the water, he started to give detailed information to the officers in charge of the salvage operations, so that they might understand the exact technical situation down below and get on with the work of raising the boat.

A day of triumph after long days and nights of cramped quarters, bad air, poor food, and constant fear of attack. Lieutenant Blacklock is asking a German submarine officer, at the time of the surrender the U-boat, where the German flag went which was flying at the mast just as the crew stepped aboard. It mysteriously disappeared.

A Gallant Officer is Killed

It was another accident to a K-boat, K-13, which robbed the service of one of its most gallant officers, Lieut.-Commander Goodhart, D.S.O. After his return from the Baltic he was appointed to command one of the new K-class submarines. While his boat was completing he went out with Commander Herbert to participate in K-13's trials.

For some reason never explained, K-13 dived with her ventilators open. The engine room and boiler room flooded, and she sank to the bottom in seventy feet of water.

All the men in the flooded compartments of the submarine were drowned.

Luckily a near-by E-boat had seen her sink and realized that she was in difficulties. K-13 sank about 3:30 P.M. one Monday afternoon. Early Tuesday morning seven craft were over the top of her, in answer to the alarm sent out by the E-boat.

But those inside did not know that help was at hand. They did everything possible to get the boat to the surface and failed. Goodhart was a passenger. He told Herbert that it was the latter's place as captain of the boat to stay with his men and that he, Goodhart, would try to reach the surface.

Goodhart outlined his plans. He would go into the conning tower and close the lower lid. Then Herbert would flood the conning tower until the pressure inside was the same as that outside. When Goodhart gave the signal, Herbert was to put compressed air into the lower conning tower and help Goodhart to the surface. He didn't say that if no boat was in the vicinity he would probably die.

Herbert agreed that Goodhart take this desperate chance. He accompanied Goodhart into the conning tower to see if he got out all right. The compartment was flooded. The water rose till it reached their necks. Then they felt the hiss of compressed air. They clasped hands. Goodhart opened the top lid, and the air forced him through the opening like a shot from a gun. He struck his head against some projection and was killed.

But his sacrifice was not a useless one, for Herbert, who stood ready to close the hatch the moment Goodhart was clear, found himself pushed forcibly upward.

(*Continued on Page 99*)

CONTINUOUS *instead of spasmodic* Naval Parleys

By WILLIAM HARD

Who watched the struggle in London

THIS WRITER has had some little experience now, not indeed in the art of participating in naval conferences but in the art—which is a much more difficult one—of watching them and trying to find out what is going on. Out of the laborious information thus gained he has a few timid and tentative suggestions to offer.

Ever since the World War there has been a sort of premium on conferences, while the ordinary channels of diplomacy have been quoted rather more or less below par. It seems to have been felt, as a general rule, that nothing of any very large importance could be accomplished through ambassadors and ministers and cablegrams and radiograms but that the moment should be awaited when delegates from many countries could travel to some distant spot and enjoy the advantage of—as it is always said—"sitting about the same table" and "looking one another in the face."

We talk now of another naval conference in 1935. We assume that the interim between now and 1935 will be, so far as naval negotiations are concerned, a blank. The dominant theory is one of conferences, which are short, and of blanks, which are long.

That is an illustration, as this writer believes, of a fundamental defect in the present conference method. Let us look at the situation which was thus produced in the Conference at London.

The Conference at London

For some eight years we have cultivated no intimate naval touch with France. We indeed had encountered France in the sessions of the Preparatory Commission of the League of Nations for Disarmament at Geneva. Those contacts, however, were fleeting; and, moreover, they were cushioned into virtual imperceptibleness by the dominance of the land and air disarmament question, as distinguished from the naval disarmament question, in the Preparatory Commission discussions. It is approximately fair, accordingly, to say that from 1922 to 1930 there occurred between France and the United States no thorough interchanges of views either on the technical naval problems, as such, or on the national defense theories and world peace philosophies by which that problem might be affected and even controlled.

The world's naval problem, in short, is condemned to a treatment which consists of long periods of quiescence alternating with short periods of spasm; and the London Conference was in some ways a spasm par excellence. There came to that Conference, for instance, M. Tardieu and Mr. Stimson.

M. Tardieu's mind, not only French but ultra-French, wholly rejects the Anglo-Saxon habit of dwelling only in the convenient present. Just as a Frenchman, no matter how prosperous, is always thriftily saving francs and sous against a rainy day, so also, and particularly if he is M. Tardieu, he is always, even in the midst of profound peace, accumulating resources of some sort against the morning when the shells may again begin to rain.

Stimson Versus Tardieu

The Englishman or the American is largely a person of one tense, the present, except when he is a person rising by dreams into a timeless millennial paradise of sudden affluence or of "no more war." The Frenchman is of all three tenses. He recollects the past and he occupies the present in making it into a logical medium through which the past can project itself into the future. The Englishman or the American can see the past as an infernal abyss and the future as a celestial glamor; the Frenchman is a terrestrial continuity. And M. Tardieu is, as I have said, the distilled essence of all the most Gallic characteristics.

"Sitting about the table" with him, and imbibing the spectatorial benefit of looking at him "face to face," was Mr. Stimson. If M. Tardieu was a stalwartly true embodiment of the French notion of abolishing wars by wars, Mr. Stimson was an equally veracious and authentic embodiment of the American notion which is so often satirized as being one of abolishing wars by "words."

Mr. Stimson recoils from commitments to force. He draws back from "sanctions." He lives in the realm of "moral guaranties." To discourage a potential aggressor, he talks of "the mobilization of the public opinion of the world." Out of that "public opinion" he proposes to evoke forces, forces of spontaneous moral combustion, which will begin by making the aggressor feel very irresolute and which, if the aggressor persists, will end by making him feel very sorry, somehow, perhaps.

When M. Tardieu listens to that sort of thing, he pinches himself on both knees to be sure that he is

Hundreds of thousands here and in England followed William Hard's talks on the Naval Disarmament Conference as he broadcast from London. He believes that the final treaty did not come up to expectations because the new type round-table diplomacy failed. In this article he describes his ideas for a less sensational but more practical method of limitation.

Rittase

An unusual view of the Philadelphia Navy Yard, where the old and the new in naval armament rub shoulders. Here lies Dewey's famous flagship, the Olympia, close to many discarded World War craft. Here also is the great and carefully guarded Naval Aircraft Factory; and here will probably be built some of the new cruisers for our battle fleet.

not assisting at a debate transferred from earth to the seventh heaven of the Franciscan mystics. When he gazes, however, at Mr. Stimson's countenance, he perceives a man as solid and substantial, and outwardly as sane, as himself. He also perceives in the course of that operation a man as resolute and as stubborn as himself. Mr. Stimson's personal persistence is just as distinguished as M. Tardieu's own.

Here, then, at the London Conference, were two men of identical obduracy of temperament treading two entirely different planes of thought and expecting nevertheless, in the course of a few weeks, through sitting at the same table and through looking at each other's faces, to harmonize and unify both the planes and themselves.

It simply cannot be done. It is difficult enough in our own American Congress, which meets every year, to cause the Northwest and New England and Texas to understand one another's peculiarities and to weld them into compromises. It is difficult enough to accomplish that task when the peculiarities considered are subnational and subracial, when the needed compromises can be effected through the duress of majority votes. The divergence, however, between the European Continent and the United States is in many ways a divergence between two substantially and inherently different civilizations, and the accommodation between them in an international conference has to be by total mutual consent and unanimity.

To hope to arrive at that unanimity, at that seeing of mental eye to mental eye, through glances of physical face to physical face for twelve weeks out of every eight years is to indulge oneself—to say the least—in a wholly exaggerated estimate of the value of faces and tables.

We surely in future practice are thereupon driven, if we would consult experience and reason, to the seeking of some alternative to, or some improvement upon, the occasional conference method of procedure.

We arrive at the same conclusion if we approach the problem from another direction. We have spoken of theories and philosophies of peace. We have spoken, that is, of what is commonly called the problem's "political" aspect. Let us now speak of ships themselves and of tons and guns.

In the course of employing the occasional-conference method we necessarily attempt to establish fleet relationships or "ratios" which shall last through considerable periods of years. At London, for instance, we looked forward to 1936 as the year in which the results of the London treaty would come into approximately full being. We attempted to say just what the world's chief fleets would be in 1936 in their absolute and relative sizes and strengths.

Now the year 1936, though not desperately far away, is nevertheless distant enough to be envisaged with some doubt and with some dread as to what its surrounding circumstances may turn out to be. The world in 1936 may be in an extremely pacific mood; it may be, contrariwise, in a mood of pugnacity.

Responsible statesmen thereupon, in contemplating 1936, display caution. They do not know what color in that year the world's complexion may exhibit. Being responsible, their motto is to consider all eventualities and to take no chances. They therefore, in accordance with their several national necessities, begin to take out all the naval insurance possible, in so far as they can do so without too cruelly disappointing the naïve expectations of their respective populaces for great and grand instant naval reductions.

Muzzles for the Under-Dogs

The statesmen of the United States and of Great Britain seek this prospective naval insurance partly through the maintenance of American and British fleets of formidable massiveness and partly—but even more importantly—through trying to wrench from Japan and from France and from Italy explicit confessions of naval inferiority to endure throughout all the incalculable political contingencies of a half-decade to come.

Japan and France and Italy thereupon instantly begin to estimate the precise depths of their proposed inferiority. Whether exact "ratios" have been mentioned to them or not, they begin exactly to calculate them. They figure it out that they are to be condemned in 1936 to be 56.6 per cent or 71.7 per cent or 55.8 per cent of the British strength or of the American strength in cruisers or in battleships, or in twelve-inch guns, or in torpedo tubes, or in naval airplane facilities, or in total assemblage of naval power. Having figured it out, they increasingly detest the very thought of it and increasingly become resentful and resistant.

They are thereupon accused of being obstacles to peace. It seems to be sincerely felt by the two upper-dogs of the naval world that the three under-dogs should wag their tails and bark in a friendly and pleased manner while they are getting equipped with collars and muzzles and are getting inducted into second-story kennels which will not be opened again till five or six years have rolled by.

Surprise is expressed that in these circumstances the under-dogs so often crouch down upon their haunches and so often have to be gently accelerated from behind by pacific and idealistic Anglo-Saxon editorials and sermons and messages from the White House and speeches from the Throne. It seldom occurs to anybody in Great Britain or in the United States that perhaps thus a certain obtuseness to the sensibilities of others is exhibited.

At the same time it is certainly quite obvious that inferiorities must exist; since it is hardly within the power even of our most accomplished international equalitarians to furnish each country in the world with perfect parity in land armaments and in air armaments and in sea armaments with each and every other country.

It is also entirely obvious that inferiorities, unaccompanied by treaties declaring them, have been tolerated, and are now tolerated, with complete patience and wholly without resentment. France in times gone by has often for long periods suffered the ignominy of having a smaller naval fleet than Britain's without thereby getting driven into making an international issue of the matter and without thereby getting driven, either, into demanding that Britain provide the French possessions with guaranties of "security." Similarly the United States, if it were asked merely to say just how many land soldiers it intended to have next year, might name a number vastly inferior to the number of such soldiers currently maintained by France and might not wince at all under the stings of such an arrangement; for it would feel no stings.

In other words, it is not really the inferiority but the detailed defining of the inferiority through a protracted period of time to come that makes the trouble. Let us consider the case of Italy.

Italy is perhaps the most difficult case existing. It is indubitably in the midst of a certain sort of renascence. A renascence can be produced through many very different and highly varying methods. It can arise from a revival of the Latin and Greek languages and philosophies. It can arise from a revival of religion. It can arise from a new gospel of the brotherhood of man. It can also arise from a new intensity of nationalism.

It happens that Italy's case to-day is the case last named. The absolutism of Mussolini is only superficially analyzed when it is denounced as a mere repetition of the absolutism of Sennacherib or Diocletian. The absolutism of Mussolini is a concession made by an effective dominating element of the Italian people to the effective flowering of Italianness. Mussolini does not essentially preach Mussolini. He essentially preaches the heightening and sharpening of every individual consciousness in Italy through a heightened and sharpened composite Italianated consciousness.

Whether we like or do not like such a route to a restored and revivified society, the fact remains that it happens to be the route that Italy is traveling and that the whole immediate internal future of Italy, as long as it follows that route, depends upon keeping its national consciousness at the most extreme stretch of vibrancy not only in its domestic dealings with itself but in its international dealings with other countries.

The Italian Point of View

It was accordingly, from the very beginning of the London Naval Conference, wholly beyond the bounds of mental possibility that Italy should agree in 1930 to be inferior on the sea to France or to any other neighboring power in 1936. An engagement of that duration bore the aspect indeed of an almost permanent engagement. It at any rate could be taken as a large precedent for a permanent engagement.

Fascism is making the Italian people labor and strive and aspire in all their daily affairs, on the theory, really, that to be an Italian is to be second to nothing on earth and that Italy, when she looks upward, sees a clear, uninhabited space between her and Olympus. That whole motivating and operating principle of contemporary Italian life would have been destroyed

at London by an engagement admitting any acknowledged foreign superiority into the Italian sky. It was therefore absolutely impossible; and candid surprise may be legitimately expressed that British and American statesmen should have dreamed that a few weeks of internationalistic argument could have any chance of persuading Italy to ruin her own internal psychological structure.

It would seem further that a really industrious and competent use of the ordinary channels of diplomacy between the United States and Italy and between Britain and Italy would have ascertained the Italian situation fully and exactly beforehand and would have spared the world the false hope of expecting a five-power treaty at London.

What I propose accordingly is some surcease both from governmental and journalistic half-cocked humbuggery. There should be, I say with growing confidence, some sort of continuing diplomatic naval effort year in and year out, and month by month, and every day, without pause and (in so far as human nature may permit) without any palpitating publicity pulpiteering.

It is still a fact, though an inadequately remembered one, that fully accredited diplomatic envoys from all the principal foreign naval powers of the world reside within easy walking distance of the State Department in the District of Columbia. It is further a surviving fact that at some considerable expense the United States maintains envoys of its own to all important foreign naval powers in residence at their capital cities and in personal acquaintance with their ministers for foreign affairs, and sometimes even with their ministers for naval affairs.

Usually, of course, the naval attaché of an embassy or legation, wherever situated, spends his time inquiring enthusiastically into the naval situation of the country in which he is a privileged guest; and the head of mission, whether called an ambassador or a minister, spends his time associating with other heads of mission, with high civilian dignitaries of the government to which he is accredited, and with local millionaires, leaving naval questions with glad resignation to the naval specialists and contriving pretty well to forget all about them unless and until an international naval conference is called to meet in the capital city of his temporary abode.

The Usual Channels of Diplomacy

My sublime idea is that the naval relationships between the principal naval powers of the world should cease to be, during the intervals between conferences, simply a matter of mutual technical good-natured spying and should become a theme of continuous, though perhaps actually quiet, diplomatic persistence and pressure, even involving the heads of mission, if and when they are able from time to time to get a little leisure from their high duty of being embodiments of good will and of eternal peace at banquets.

Not to lay too heavy a burden upon the heads of mission, I suggest that the third secretary, or perhaps even the second secretary, should be instructed to collaborate with the naval attaché and try to keep all naval matters in the steadily running current of truly diplomatic knowledge and negotiation. There might even be, also, a "continuing committee" of diplomatic and naval experts, representing all naval powers of consequence and sitting at one of the world's chief maritime capitals, for the sleepless collecting of naval data and the equally sleepless observing of the emergence of naval competitive difficulties.

The position here maintained is that continuing negotiations should be brought into existence (a) by a renewed and enlarged use of the ordinary channels of diplomacy which, after all, are manned by people who can readily learn much more about naval matters than can possibly be known by intermittent delegates to sporadic conferences and (b) by setting up a central clearing house for purely naval problems and projects at some capital city truly involved in naval building exigencies and in naval reducing aspirations.

A Cure for Naval Convulsions

These preliminary reforms having been accomplished, and the technical data for naval agreements having been advanced into a condition of continuous up-to-dateness and availability, the agreements themselves should henceforth be attempted, I venture to believe, annually.

The naval budgets are annual. There would seem to be absolutely no solid reason why the international diplomacy of naval budgets should not be annual too.

This would not necessitate annual conferences. If there was general satisfaction among naval governments with next year's building programs, as disclosed by diplomatic negotiations and interchanges of present and prospective naval facts, no conference would be required. That would be a happy omission from the year's potential frictions.

Conferences would be called only when the frictions were so bad that even a conference would be a solace. The normal course of things would be to take the present manifestoes of lofty pacific purpose and the present public catalogues of tremendous and formidable national naval defense needs, all issued for political home consumption, and submerge them under the unobtrusive, soothing, man-to-man question:

"See here, now, altogether aside from the heroic history of your people, and altogether aside from the altitudinous destiny to which Nature and Nature's God have beckoned them, how many ships, actually, and of what sorts, are you going to impoverish yourself to build during the next twelve months?"

Out of a fairly prolonged contact with the psychological peculiarities of national and international politics I am profoundly convinced that the system of things exemplified in that question would bring us more genuine naval reduction than from now forward we can hope ever to achieve through the system of diplomatic deadness alternating with conference convulsion.

Twelve months is a period which the governmental eye can penetrate to the end without panic. Twelve months is a period during which even the most sensitive government can afford to be modest, and during which even the most apprehensive government can afford to be moderate, in its building intentions.

Diplomacy all the time. Attempts at agreements every year. Conferences only when every other means fails. That is how I would hold naval-reduction conferences in the future.

Germany maintains an official Aerial Weather Bureau. A few of the pilots and one of the planes of this government service. The small but very useful instrument on the under side of the wing is a barograph which records atmospheric pressure accurately at altitudes of from five hundred to seven thousand feet.

THE MEN *who fly the* Planes

By MYRON M. STEARNS

ON JANUARY 1, 1930, there were in the United States 10,215 airplane pilots licensed by the Department of Commerce. Of this total, approximately half—4,895—received their licenses last year.

These pilots are classified as private industrial, limited commercial, and transport pilots. Transport pilot is the highest. There are so far 4,507 transport pilots, or 44.82 per cent of the total. Limited commercial and transport pilots are alone allowed to fly passenger planes—the former under certain sharp restrictions.

To receive a transport license a pilot must have had at least two hundred hours of solo flying, equivalent to perhaps fifteen or twenty thousand miles in the air. He must be "of good moral character." He has to pass an exceedingly strict physical examination, a difficult flying test, an examination in engine and plane mechanics, and other examinations in the fundamentals of meteorology and air navigation. He must also be at least eighteen years of age. Only the Department of Commerce, so far as I know, can give the age of the individual licensed pilots. But we can assume conservatively—very conservatively—that the average age of the pilots licensed during 1929 was well under twenty-five years. Of the more newly licensed men whom I have met personally, only one is as old as that. One unusually highly rated pilot, for example, who received his transport license last year and is now employed by one of the largest passenger-carrying

companies, graduated from college less than two years ago and is now twenty-three. I flew as one of his passengers on a tri-motor transport.

Of all the transport pilots in the country, only a few hundred are more than thirty years old.

That fact has its advantages. Young men are skillful and keen and quick to learn. The chief pilot of one of the oldest and most successful air lines told me he preferred to get the young men when he took on additional pilots: "Yes, men under twenty-five."

But when I pressed him for an estimate on the number of pilots whom he considered eligible for the positions he had to fill from time to time, who possessed the necessary poise and experience and caution as well as skill in maneuvering a plane, his answer was: "Oh, possibly two hundred."

In spite of his desire to enroll youth, he was referring largely to the old-timers, the wartime flyers, barnstormers, and mail pilots who, with the addition of a few of the more highly gifted youngsters, constitute the aristocracy of the flying profession. Between this Old Guard—the two or three or four hundred men who have been flying, many of them, ever since the war—and the new transport pilots, who are "at least eighteen years of age," there are, of course, many gradations. But in the main the newcomers are not so very different from the average run of newly minted college graduates, with the future before them and the world at their feet.

Boris Sergievsky, ranking Sikorsky pilot, is forty-two years old. He served under the Czar and, after the revolution, with the English. His many world's records and his experience make him one of the country's crack pilots.

In the case of young lawyers or teachers or civil engineers the confidence—even the overconfidence—of youth is a stimulating thing. We may smile at it, yet we respect it too. But in the case of airplane pilots, overconfidence too frequently means death.

I was thinking of these things last December, as I journeyed by air from San Francisco to Seattle. An airplane can, in the very nature of things, be no more safe than the man who flies it. Civilization is, in spite of the progress of knowledge and industry and scientific achievement, no stronger than the man who lifts the lever, who turns the wheel, who sails the ship, who signals the engineer, who pilots the plane.

I found it comforting, looking down through misty air into farm-filled valleys between the great wooded ranges of Oregon, to realize that the pilot of the plane, Arthur Starbuck, belonged to the older group of pilots. He had been flying, I knew, for nearly twelve years and had more than seven thousand hours in the air to his credit—the equivalent of flying nearly thirty times around the world.

At Portland, well into the forenoon, the field manager met me as I climbed down from the plane. "Sorry," he said, "but I guess this is as far as we'll be able to get you. The weather's pretty thick around Seattle. If you want, one of the boys will take you down to the train."

I explained that I was not a regular passenger, and in no particular hurry to reach my destination. I had done so much transcontinental flying that I was beginning to be something of an "old-timer" myself.

The field manager considered. "We'll put it up to Miller," he said. It was a concession. So far as courtesy permits, pilots are spared the necessity of personally refusing to carry importunate passengers when weather conditions are bad.

Jack Sharpnack, who flew the first load of air mail from Reno to Salt Lake City in 1920. He is a skipper who knows his route as well as the captain of a coastwise ship knows his shore line.

Heber Miller proved to be another old-timer. Like Starbuck, he was tall, weather-beaten, spare, somewhere in his thirties. He listened without comment, watching the ground crew gassing the plane.

"If he wants to come just for the ride," he told Mr. Hubble, the field manager, "I'll take him." He inclined his head toward me with a slow smile. "Maybe we'll find something to write about. But if we have to come back here to Portland, it'll be slower than taking the train."

Halfway between Tacoma and Seattle, hardly ten minutes from the airport, we ran into a fast-moving low scud that blanketed the ground. To the north it was thicker. Unwilling to lose contact with the ground, Miller banked and hunted for open spots. The plane wheeled and circled, crossing and recrossing a little stream perhaps two hundred feet below. Never once were we in the fog for more than the flash of a second. I have rarely seen a plane turn more swiftly or so continuously. The game was to keep from getting caught in the cloud, to keep as near the airport as possible, to keep in constant "contact" with the ground, watching for a chance to get in.

Fifteen minutes, and the trick was turned. It was a beautiful exhibition of skilled, smooth flying. "After all that talk at Portland," Miller said, "it looked as if we'd get in without having a thing to show you."

He was an Easterner by birth, a Westerner by long adoption. He was of the capable, large-boned Yankee type that makes the word respected in the North woods and on the Grand Banks of Newfoundland. But underneath the surface one felt what I believe is characteristic of the best old-time transport pilots—a certain easy quiet, or sense of proportion.

I have met many of the old-group pilots of this type—Ray Little, who flew the first load of air mail

Arthur Starbuck, with twelve years' flying experience behind him and with more than seven thousand hours in the air to his credit, has conquered every sort of weather.

from Oakland to Reno on September 8, 1920; Jack Sharpnack, who relayed it on to Salt Lake City; "Slim" Lewis, who stands six feet four and weighs two hundred and a quarter; Wesley Smith, of National Air Transport; Frank Yager, who has eight thousand flying hours to his credit, which means something like one hour out of every twelve, one month out of every year, spent in the air since 1918; H. G. Boonstra, who has been with the air mail since it started.

All these men, and scores of others of the older group, are excellent pilots because their flying skill has been rounded out and amplified by years of experience. They have been through emergency after emergency—and come out safely.

Last November, for example, V. R. Lucas, one of the men who may fairly be considered as intermediate between the older and younger groups but who is already a fine pilot, was forced down by bad weather in New Mexico. He was flying one of the big Transcontinental Air Transport tri-motors on the Western division of the air-rail hook-up, the Los Angeles-to-Clovis run. He had four passengers, all men, besides the courier, in the 12-seat cabin. His plane had radiophone connection, through a 200-foot trailing wire antenna, with the nearest ground station: Albuquerque. It was already dark.

Over the mountains near the small town of Moriarty he ran into a snowstorm. Putting on his ear phones, he talked with the Albuquerque operator and learned that another storm had shut in behind him. He decided to land at once. A more confident and less experienced pilot might have tried to go on to his destination, to avoid the risk of a night landing on little-known ground.

"I'm almost over the lights of Moriarty," Lucas told Albuquerque. "Guess I'd better sit down." He was choosing the known risk, great as it was, rather than the possibly still greater risk that might arise if he kept on.

"Good luck!" said Albuquerque.

The courier reeled in the trailing wire. Close to the town Lucas circled what he judged in the darkness to be a fairly flat field. He dropped a flare, which lit up a wide area. The ground seemed level. An automobile driver, seeing the big plane circling, apparently in distress, turned off the road and threw the glare from his headlights across the field, indicating apparently that it was a good place to come down. Lucas turned on his landing lights and came in.

The ground was a little rougher than he had anticipated. While he was still traveling at perhaps fifty miles an hour there came a sudden *whang*. The heavy plane had struck a wire fence, unseen in the darkness. Lucas held it level and jolted to a stop. The passengers were unhurt. Within fifteen minutes the trailing wire had been unreeled again and fastened

St. Clair D. Welsh, thirty-two years old, is one of the many who left the cockpit for the manager's desk. He enlisted in the army in 1917 and has stayed with aviation, partly as a pilot and partly as a parachute tester. He is now operations manager on the Eastern division of the TAT-Maddux Air Lines.

Heber Miller, of Boeing, who taught the author a few tricks about bad-weather flying in a fog over Seattle. One of the old-timers, he inspired his passenger with his easy quiet and his keen sense of proportion.

to a fencepost. Lucas put on his ear phones and called Albuquerque.

"All O. K.," he said. "We'll stay here overnight and come on in to-morrow morning."

There is the case of Jack Knight, who now flies mail between Cheyenne and Omaha. He was flying mail east from Chicago to Cleveland with a Martin bomber, in the days of Post Office Department air-mail operation, when his aileron controls froze, making it impossible to maneuver the ship. Then both his motors went dead, one after the other. Still he managed somehow to bring the plane down safely in a dead-stick landing at Gary, Ill., with no damage beyond a broken tailskid.

These are the things that, taken together, make pilots. It is in their ability to read weather, more than in anything else, that the old-timers have their greatest advantage over the younger men. Flying is like sailing in that it is a continual contest with cloud and storm.

The older pilots will often fail to get you through on time. Flying with them, you may get to your destination a day late or three days late; but they will see that you get there safely. A year ago I waited at Omaha five days, before one of the Boeing Air Transport pilots considered it safe to fly farther west.

On the other hand, I've flown in a big tri-motor, with two confident young fellows up forward at the controls, right on into a thickening snowstorm at night, with a cabin full of passengers. As luck would have it, they got between two storms and found their way safely to their scheduled airport. But it's not pleasant to think of what damage might have resulted if the storms had closed in and caught them "blind" with a dozen passengers.

In the early days of the air mail there were about forty pilots on the transcontinental run. Four of them, on the average, were killed each year. Conditions then were far more hazardous than they are to-day. Still, many of the more cautious and capable of those pilots of ten years ago are still "pushing mail" to-day.

Besides knowing weather—or as a necessary part of that knowledge—a transport pilot must be thoroughly familiar with his "run." Here again we can turn to our nautical parallel. On a long air journey, the land along the routes takes the place of the shoreline for coastwise boats; each airport is a possible harbor, each flat field along the way the equivalent of a cove or inlet that may give shelter in a sudden storm. Each steep hill, each tall pole or tree or building or wire near an airport is the equivalent of a dangerous rock.

Men who know their route and who are acquainted with its every square rod can fly it safely under weather conditions that would make it extremely dangerous for a new man, no matter how good a flyer he might be in clear air. Men who cover the same 400-mile stretch day after day come to know every field, every farmhouse, every hillside along the way. They

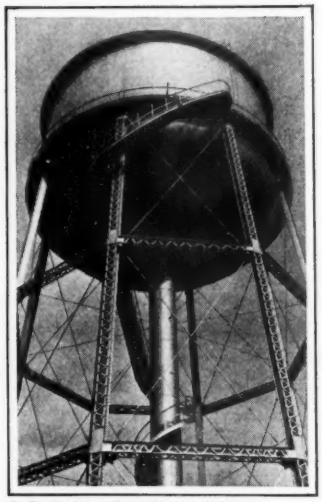
(*Continued on Page 99*)

Vernon R. Lucas, flying a huge TAT tri-motor transport, ran into a snowstorm and chose the known danger of landing in a large field to pressing on blind, although fairly near the airport. A less experienced man might have kept in the air and taken the chance that age and caution refused.

Courtesy Duke Power Co.

The Bridgewater development, including Lake James and a power plant. Throughout the wet months of winter, spring, and early summer, when the rivers are normally full, water is impounded in the lake, which covers seven thousand acres of valleys, for use later on by the power plants dotting the Catawba River.

WATER WORKS ITS WAY

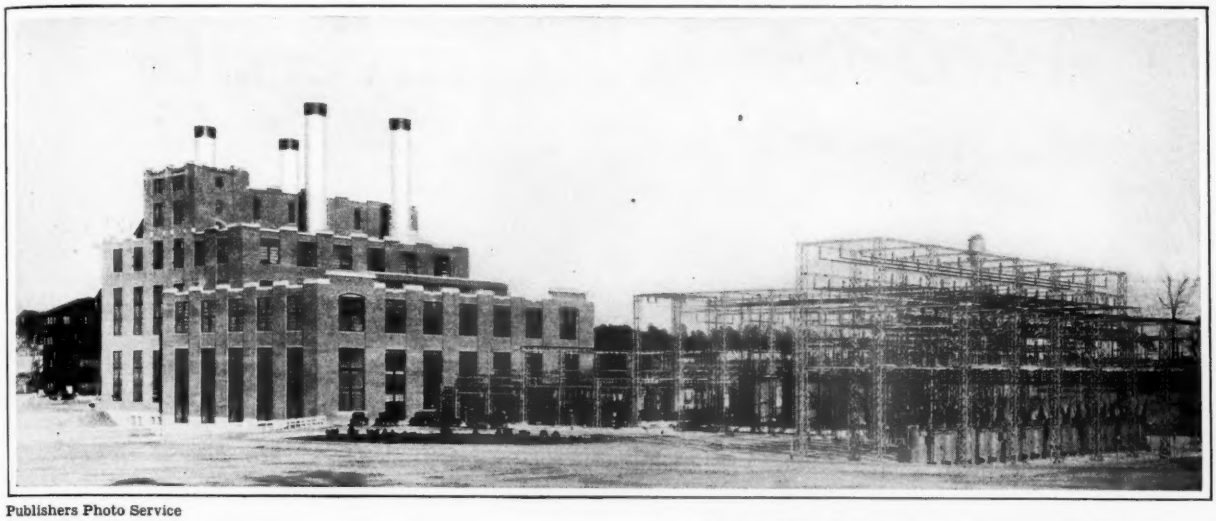


C. P. Cushing from Ewing Galloway

Above—An unusual view of a great water tower at Elizabeth City, N. C. Piedmont is fortunate in the purity, as well as the abundance, of its reserve water supply.

Courtesy Duke Power Co.

Right—New Catawba hydroelectric station with a generating capacity of 80,000 horsepower. Such units enable Piedmont industries to get power at less cost than in the days when it was necessary for each to establish and maintain a plant.



Publishers Photo Service

Above—The Duke storage plant at Charlotte, N. C. Twenty-five years ago the Southern Power Company served thirteen mills with a total of 150,000 spindles. To-day the Duke system supplies over three hundred mills having more than 6,500,000 spindles. Such has been the importance of power to the New South's textile industry.

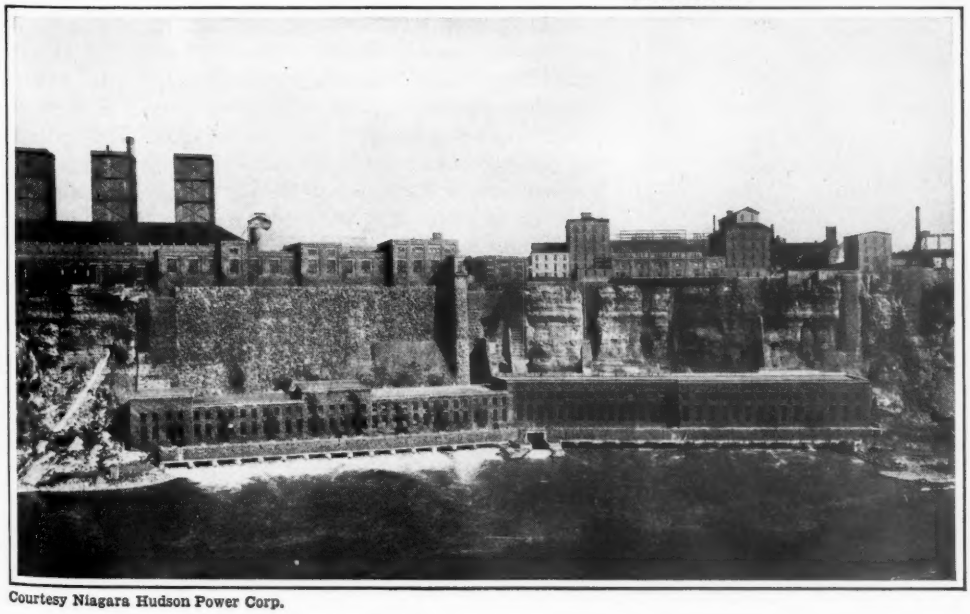
WATER has long been used for all the important purposes to which we now put it—drinking, cleanliness, pleasure, transportation, irrigation, and power; but the industrial age has given new impetus to utilization of water as power.

It was only fifty-three years ago that Jacob F. Schoellkopf bought riparian rights at Niagara Falls for but $76,000. To-day the Schoellkopf Station at the Falls is the largest hydroelectric power station in the world.

The same source of power has had much to do with the recent industrial comeback of the South, especially in the rich Piedmont section of the Carolinas. James B. Duke estimated the potentialities of the region and the character of the people, and the tremendous development which has taken place there recently is a monument to his vision. Since 1910, wealth in the 42nd Street and Fifth Avenue section of New York City has increased 631 per cent; in the same period of time, wealth in Piedmont has increased 660 per cent. But thousands of rivers, in the South and elsewhere, still pour their unused power into the sea.

Culver Service

Above—The greatest city makes sure of its water, without which panic would ensue inside of twenty-four hours. The fork in the Catskill aqueduct to New York. The main passageway is fifteen feet in diameter.



Courtesy Niagara Hudson Power Corp.

Left — The world's largest hydroelectric plant, Schoellkopf Station, Niagara Falls. Inside those placid cliffs of solid rock are guided the torrents of mighty Niagara which generate 448,000 h. p.

Two-Legged University

By FREEMAN TILDEN

The University of California stands on its own feet, one planted firmly in Berkeley and the other in Los Angeles. A great educational force on the West Coast, the physical distance between its north and south "legs" is symbolic of the giant strides it has made in recent years. On the first of this month, thirty-eight year old Robert Gordon Stroul takes office as president of the state institution. He will be ably supported in an ambitious program of development by the southern branch director, Dr. Ernest Carroll Moore.

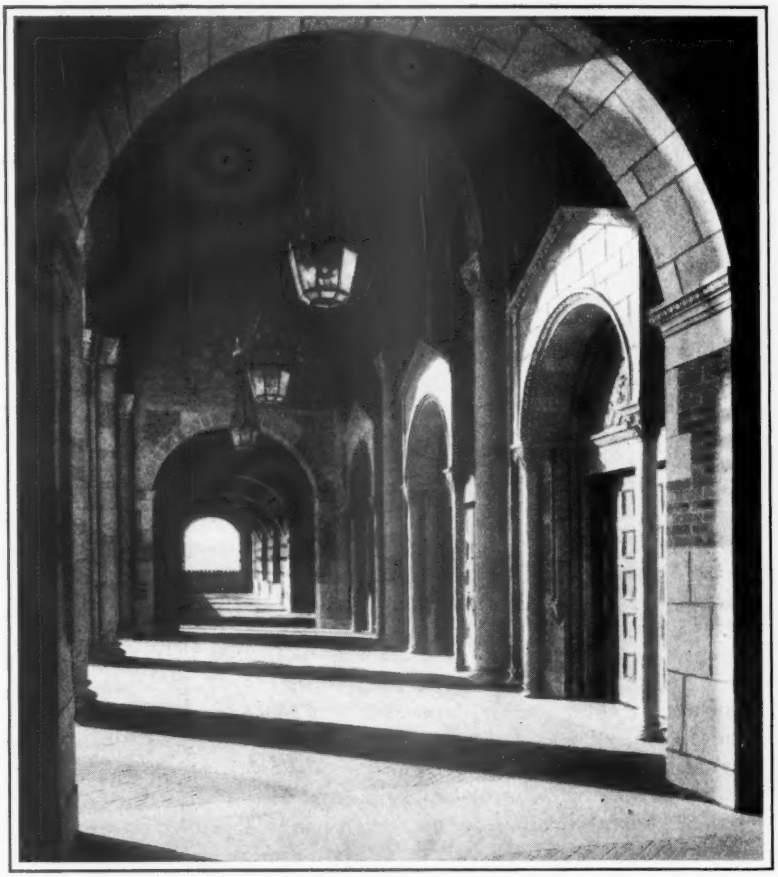
IN OCTOBER, 1849, the constitutional convention that resulted in the admittance of California as a state was held in Monterey. It was an extraordinary meeting in many respects. One striking feature was the youth of the delegates. Most of them were in their thirties; only two men had passed fifty.

Those Monterey delegates were, many of them, rough men. There were political questions of paramount importance to be faced. The convention was actually a daring move on the part of the Californians to force the issue of statehood. But no person can read, to-day, the report of those debates without marveling at the steadfast devotion of the members toward their ideal of making education in the new state as free and as thorough as possible.

Two sections in each township were set apart for school land and seventy-two sections for a university; five per cent of the proceeds of the sale of public lands were to support the schools. Two men, both self-educated, both Kentuckians, and both forty-two years old, were eloquent in their pleas for a liberal school fund. They were Robert Semple and M. M. McCarver. Semple argued that California could have a university equal to any abroad; "she has the gold-dust to pay for talent." He added: "We can bring the president of Oxford University here by offering a sufficient salary."

It is easy to laugh at the naïvety of that last statement. It was a bit of the irritating self-confidence and bombast that, in our yeasty years, Charles Dickens recorded with asperity in his American Notes. But what must chiefly be remembered is the fact that those Monterey pioneers gave to the state of California an attitude of generosity toward, and interest in, free education that has never waned. Rather it has been nourished with the years; and now, eighty years after Monterey, it is coming to a fulfillment beyond anything the pioneers could dream.

The year 1930 sees the University of California embarked upon an enterprise of education that has no parallel, for the opportunity has never existed



The central portals of Josiah Royce Hall. The dominant style of architecture at Berkeley is Italian Renaissance, as embodied in the Sather Campanile on the opposite page. Almost thirty years ago the University regents adopted an architectural plan for the whole campus.

before. This year, under the guidance of a new president, with a program of building and reëquipment of vast proportions, and with a new conception of its possibilities in a changing world, the University of California is gathering together its component institutions into a strong federation with two clear purposes: first, to increase to the highest degree its service to American scholarship; second, to reach out to all those shores washed by the waters of the Pacific Ocean.

It is to be, finally, the University of the Pacific—not in name, to be sure, but in purpose and scope. It is an enterprise worthy of the courage and foresight of the pioneers of '49.

In its present efforts toward this ideal the University of California is reorganizing its resources. The reorganization is not violent. Outside the administrative offices of the University it is hardly perceptible, except that the outside world may view the phenomenon of the new campus at Los Angeles springing fully equipped from the old barley fields of Westwood or pause to note the swift physical changes in the old campus at Berkeley, as one structure after another rises and takes its place in the organic life of the university.

Far-Flung Activities

The noted scientist and scholar W. W. Campbell gives place, as president of the University, to a man of thirty-eight years, saluted as "Bob" Sproul by thousands on Berkeley streets, an ex-president of the Rotary Club. At this news the Campanile does not totter, and the face of Pallas remains serene. There is no whisper that learning is to go into receivership. On the contrary, in California, the understanding of this event is tacit: the University is at the end of a period in its development, and it faces the new day with enthusiasm. Robert Gordon Sproul, class of 1913, the new president, is an administrative and executive expert. As comptroller of the University for several years, he has been the savings bank of scholarship; now he is to become its Federal Reserve.

Dr. Campbell, the retiring president, leaves his executive position to return to his beloved astronomical studies, with the richly earned gratitude of the University. He stamped quality upon its work and attainments; and when he came, he found a deal of embarrassing quantity. All that is precious in the scholarship of the University will now be released to perform its full work. The business of running a colossal institution falls to the lot of a sagacious business leader, a man of affairs. But, fortunately, this business executive is ardent in the cause of scholarship. He will play an understanding Atticus to any man's Cicero. He wishes Cicero to have full opportunity to be himself.

The need for the reorganization of the far-flung parts of the University was imperative. Educational effort, however well-meant, was beginning to go to waste. The very diversity of the University's activities and the complex and sometimes conflicting demands made upon their institution by the people of the state made it necessary to coördinate and clarify. In the part of California that lies south of the Tehachipi—that which is commonly known as Southern California—a great ambition began to be realized last year. They now have a campus of the University of California upon their own soil, so convenient to the city of Los Angeles that the city itself is a dormitory for most of the students. Their pious prayer for educational autonomy has been answered.

It is difficult to know how to describe what has taken place in the physical economy of the University of California. The "University of California at Los Angeles" is just as much the University of California as the "University of California at Berkeley." This awkward assembly of words is absolutely necessary to indicate what has happened. If the people of Southern California had wished an entirely new university, they could have built and manned one. Los

Angeles and the other cities of the district are increasingly populous and increasingly rich.

But a new university in Southern California would have been, after all, just another university, however prosperous. What was necessary was to light a taper at the altar of the old University at Berkeley and with it kindle the fire in a new household, of the same family, to the south. Thus all the resources, intellectual and material, that have been stored away in Berkeley for so many years are shared with the section in Westwood.

There is no separate cumbersome administrative machinery. The University at Los Angeles began its promising career with only its local government and educational problems to consider. This splitting of a state university into two greater parts is, of course, new. In our times it will probably be necessary only in a state so territorially big, and so populous, as California.

Dr. Sproul, who formally takes office as president of the University of California on July first of this year and who will be inaugurated some time in October, will be one of our youngest university executives. When I suggested this to him, he smiled with his characteristic and ingratiating smile and replied, "Oh, not so young as Dr. Hutchins, in Chicago; and besides, I think you will find that Charles Eliot was only thirty-five when he became president of Harvard." He is a true son of California and also a true son of the life intellectual, for his father was of Glasgow University, in Scotland, and his mother was of New England.

Physically large and vigorous, and full of that old-fashioned quality that used to be quaintly called good nature before a nervous and harassed world decided that the epithet might be interpreted to mean weakness, Robert Sproul brings to the office, besides his love of scholarship, a remarkable ability to get along with people. This qualification, in a state university where tactfulness and reasonability are so important in dealing with citizens and legislatures, is priceless.

Also invaluable, as all state university heads will cheerfully agree, is Dr. Sproul's high vitality. It is not so many years ago—in 1910, accurately—that the man who is now to be president was running his two miles against Stanford on the old California oval. It is reported that as he was romping down the stretch so far ahead of his fellow runners that there was no real race, splashing along the track gayly in a driving rain, some friendly soul stepped out and passed him an umbrella as he went. So Sproul finished holding the umbrella over his head. Nowadays he still holds an umbrella over his head; but this time the covering is figurative. It is his engineering training, together with his administrative experience in the service of the city of Oakland and as comptroller of the University. State university presidents will agree, again, that this is an excellent umbrella.

Robert Sproul believes in intercollegiate athletics, heart and soul. He will be one of those alumni at the big games that will not stint of voice and heart; but in answer to my question, whether he did not think that college athletics is overstressed, he replied frankly: "I do. Just because I am such a warm friend to intercollegiate games, I am sorry to see it. It will end, I'm afraid, by killing these sports."

The new president conceives it the duty of the University to hold the alumni, the men and women

International House, to be built at Berkeley, for which John D. Rockefeller, Jr., donated $1,750,000. Due to the University's primacy in number of foreign students, it is hoped that here international understanding will be fostered by the many alien and native-born students rooming under one roof.

Dr. Robert Gordon Sproul, newly elected president of the University, who takes office this month. He will direct the activities of a great group of men engaged in almost every conceivable line of education, from important cosmological research at the famous Lick Observatory to teaching young men just beginning their freshman courses at Berkeley.

who have gone forth from the campus and occupied themselves with business and domestic affairs, as tightly to their traditions and cultural interests as may humanly be.

He knows that this is not easy. It is one of the dreams college executives love to dream, but in a hurrying and high-pressured world it is difficult to realize. Nevertheless it is a definite program with him to bring constantly the cultural resources of the University to those who have been graduated; to keep the contact alive and vibrant and never to admit that the relationship should peter out into a mere enthusiasm for an annual football game. The best efforts of the University will be employed in this adult education.

An immediate part of the program will be the pulling together and coördinating of the work of the engineering departments under a single dean, except in the case of mining engineering, which in this University has special traditions. Also, in the agricultural departments a great strengthening is already under way. With the appointment of Dr. C. B. Hutchinson as dean of the College of Agriculture a genuinely new era begins, for Dean Hutchinson was brought to California to be the head of the Giannini Foundation.

Performing Useful Work

In January, 1928, the Bancitaly Corporation of San Francisco offered to the regents of the University, as a tribute to Mr. A. P. Giannini, the sum of $1,500,000 to be used in establishing the Giannini Foundation of agricultural economics in the College of Agriculture. This gift was accepted, and Giannini Hall is now being hastened to completion in the agricultural quadrangle at a cost of about $500,000, the remainder of the money to be used as an endowment for these chief purposes: first, to find the facts or conditions which will promise or threaten to affect the economic status of California farmers; and second, to formulate ways and means of enabling those farmers to profit from the existence of favorable facts and to protect themselves from adverse conditions.

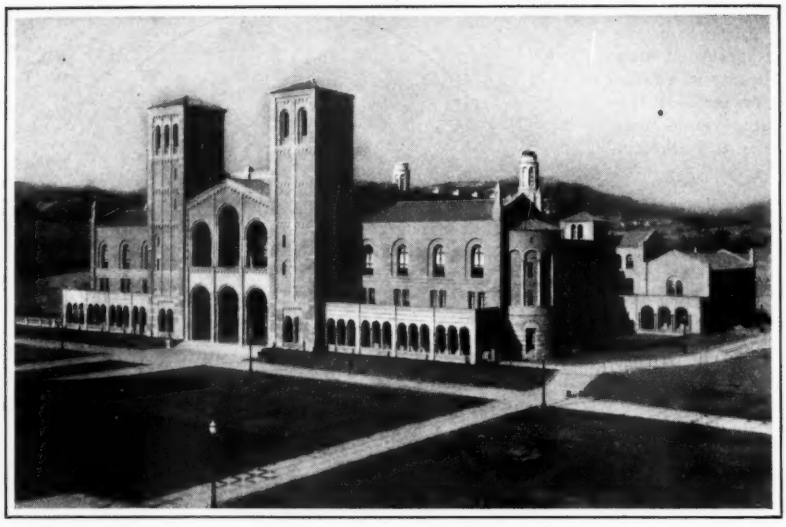
This, it may be admitted, is a large order—and a large work. It strikes at the very root of agricultural economic problems, not only in California but elsewhere; for it is a fact that the splendid work of the agricultural colleges, including that of Davis in California, in raising the standards of production and increasing the field efficiency has lacked something to make it finally effective. This lack has been, precisely, the want of a fact-finding body which would permit the production to be fitted profitably to its market.

Although the University of California is a state institution, the extent of the generosity of private individuals toward it is remarkable. Endowments from donors total nearly $15,000,000, and last year the income from these endowments was $600,000. As a result of the affection and enthusiasm of Californians for their institution, the University has come into possession of a water company, a vineyard of 5,035 acres in Fresno County, a rice experiment station in Colusa County, an agronomy station in Imperial County, a deciduous fruit station in Santa Clara County, and the beautiful Whitaker forest in Tulare County—320 acres of "big trees" that are being used as a place of forestry investigation as well as a public playground.

It has been quite natural for Californians, in years past, to lay great emphasis on the words "big" and "biggest." This, in turn, has resulted in an impression, abroad, of a beehive swarming with young hopeful insects, with an accompanying policy in which the individual student might at best jam his way into a packed classroom and receive a fractional attention.

Now this situation is precisely what the University of California strives to avoid, and rather successfully. When broken down into its parts, and considering the graduate students apart, the student body in Berkeley is not proportionally large; nor will the case be different at Los Angeles when that leg of the University is physically completed. There are many institutions, says Dean Monroe E. Deutsch, of the College of Letters and Science, much smaller than the University of California that have elementary lecture classes of two or three hundred students, where no effort is made to break the large groups into smaller units for discussion and conference.

Dean Deutsch's efforts are all toward the creation of small groups. It is not yet possible, but he looks forward to the time when the undergraduate body can



Josiah Royce Hall houses an auditorium for nineteen hundred, fifty professors' offices, and almost as many classrooms. With 19,000 students from all over the world crowding its campuses, California stands third in the country in point of numbers. It ranks only sixteenth, however, in the amount of its endowment.

be split into small units, little "colleges" with separate identity, in charge of the best teaching forces, and at the same time free to draw upon the entire resources of the University faculty and equipment. Even now, the requirement for instructorship is the Ph.D. or its equivalent; and of 190 teaching fellows, all but twenty are candidates for the doctorate, and nearly all are experienced in graduate work.

In the very construction of the buildings on the campus at Los Angeles, Dr. Ernest Carroll Moore (director of the southern branch) and his fellow enthusiasts showed that they were following in no groove. A new institution called for fresh ideas, and they began at the foundation to create something not only beautiful but unstereotyped.

Spanish and Mexican architecture fits nicely into the background of Southern California, but the profuse use of this style has resulted in cliché. There are other lovely styles, and these may originate in lands where the climate and visual conditions are not unlike those of the country south of the Tehachipi. So Dr. Moore and his architects went to the north of Italy for their inspiration, and the result is better than they could have dreamed.

In Bologna—which, by the way, was the seat of learning that gave Dante and Petrarch to the world, and where as early as 1262 there were nearly ten thousand students—the builders at Los Angeles found beauty of the sort they could employ. Not in Bologna University, but in those churches that cluster under the general name of San Stefano, is contained the original of nearly every motif that made Lombardian architecture distinct.

Sheer Joys to the Eye

These motifs have been translated, in terms of soft, rosy-colored brick and light artificial stone, for the purposes of the new institution in America. Two of the buildings are sheer joys to the eye: the library, with its magnificent reading room and a domed delivery room through the windows of which the afternoon sun filters and makes a curiously restful rose glow, and Josiah Royce Hall, aptly and happily named for that son of California—he was born in the little mining town of Grass Valley—of whom William James said, when Royce was a young man, "He knows everything."

The 384 acres on which the buildings and grounds of the new University are situated have the most delightful situation imaginable. They are on the edge of the foothills. On one side are the mountains, on the other side is the sea. This land was bought by the city and county of Los Angeles and three neighboring cities and deeded to the University of California.

Already provided for, or in process of erection, are two gymnasiums, a building for the mechanic arts, and a residence for the director. Work is going forward on a university union, the gift of Mrs. William G. Kerckhoff, of Los Angeles. Not far in the future is the prospect of a new administration building, research laboratories, and a Greek theater. Assuming the value of the land on which the institution rests to be, at current valuations, about ten million dollars, the investment in this new university to date is rather more than $25,000,000.

In a Suburb of Los Angeles

For years Southern California has felt that it should have a station, or part, of the University of California easily accessible to the increasing number of the young men and women who were anxious to "go to college." Many students, residents of the city or county of Los Angeles, can now attend classes at Westwood, live at their own homes, and perhaps have regular part-time employment in the city as well.

Beyond this Los Angeles and neighboring cities were beginning to feel a local pride, to wish for some part of the state university that could be identifiably their own. There has probably never been, in recent years, less of anything that could be called jealousy between the higher and lower parts of the state than at the present. But, when all is said and done, the thought method of California Alta and California Baja is not quite the same. It may be climatic, it may be a difference due to the sectional origin of the inhabitants; but so it is.

Under the present arrangement there will be only one University of California, governed by a board of regents and with a president. But, as President-elect Sproul told me in Berkeley, "the government of the different parts of the University will be on the principle of home rule—autonomous working parts like those of the British Empire, commonwealths working toward a common end." This applies not only to the part in Los Angeles, but to the Agricultural College at

(*Continued on Page 96*)

Eighty Thousand Weekly

The Department of Commerce, headed by Robert P. Lamont, answers that many questions for business men

By THEODORE G. JOSLIN

"I THOUGHT I worked hard in business, but I have worked harder since coming to Washington than at any time in the past twenty-five years." This is the statement of Robert Patterson Lamont, the Secretary of Commerce. He was justified in believing he was an authority on what constitutes real work, for he had served not only as president of the American Steel Foundries of Chicago but as a director of many great corporations. However, the demands made upon him as a member of the Hoover Cabinet have convinced him of the error of his judgment.

Something other than glory and prominence is attached to these high appointive offices. It is unremitting labor, making insatiable demands upon the mental and physical powers of the incumbent, whatever may be the portfolio he holds. This is especially true in time of stress, applying particularly to Secretary Lamont because of the business recession which the country has been experiencing in recent months.

The Department of Commerce, of which he is the head, is the one branch of the government most intimately associated with the industrial affairs of the nation. His task has been to utilize the machinery at his disposal, machinery carefully assembled by President Hoover, another engineer like himself, to offset as expeditiously and thoroughly as possible the disastrous effects of the stock-market collapse of last winter.

Although at a disadvantage on the public platform, laying no claim to oratorical ability, Mr. Lamont has proved to be a square peg in a square hole. A diagnostician of business affairs, demonstrating over a long period of years a peculiar genius for solving business problems, he has been able to render specialized service to harassed industries, if not succeeding in restoring prosperity, surely offsetting depression in part.

Through the Department of Commerce the business of the country comes most closely in contact with the government. In this article Mr. Joslin explains how this branch of the Federal Administration is organized to serve the business public in a multiplicity of ways. The enormous new Department of Commerce building on the Mall is tangible evidence of the important part the Department, nonexistent before 1903, has come to play in our economic welfare.

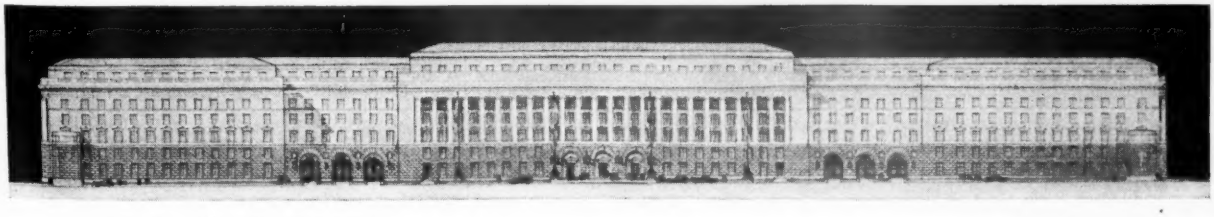
It has been through the minute surveys Mr. Lamont has made of business that President Hoover has been kept advised of every development. He has personally represented the President in bringing about the coöperation of business, industrial, financial, and labor leaders as well as state and municipal authorities in starting in motion the gigantic construction programs, involving expenditures of several billions of dollars intended to revive business and end unemployment.

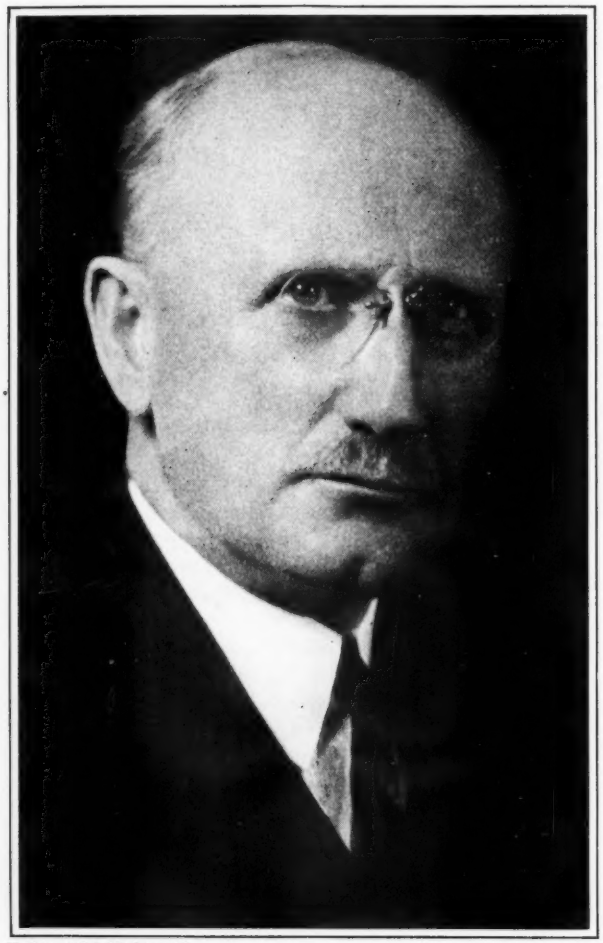
The Secretary has put to the test the Department so thoroughly reorganized by his predecessor. Business, great and small, has been advised that the facilities of his particular branch of the government were at its disposal. Thousands of difficult questions are asked of the Department of Commerce each week, as many are answered fully within twenty-four hours, and many more personal calls are made at this national bureau of business information for facts about every conceivable subject relating to commerce.

These contacts have been established and utilized with little or no public notice, perhaps because Mr. Lamont is not the type of man who seeks publicity. Of all the members of the Cabinet he has perhaps the least to say, formally or informally. He sees work that must be done and he applies himself to it. Once it is accomplished, he lets the result speak for itself.

He abhors extravagant statements. He is a conservative, personally and professionally. He personifies the successful business man. Except for baldness, he does not look his sixty-two years. His eyes are as keen as his face is florid. He reflects physical strength as well as strength of character.

Public life is a novelty to Mr. Lamont, who does not know to this day how President Hoover happened to select him to head the Department in which the





Underwood & Underwood

The Secretary of Commerce does not yet know how Mr. Hoover chose him for a post in which the President himself has such a large personal interest.

Executive has the deepest personal interest. The secretaryship is the only official position Mr. Lamont has ever held, and the only one he ever expects to hold.

For almost forty years he has been intimately identified with the business life of Chicago, a city to which he went by chance in 1891 upon graduating from the engineering department of the University of Michigan. A friendly upperclassmate, who had gone out into the world a year earlier than he, advised him that an engineering position was open at the Chicago World's Fair.

Mr. Lamont filed application and received the position, which he held for about a year. During that period he became acquainted with other engineers, one of whom was connected with a contracting firm which was putting up some of the buildings. The World's Fair work completed, he became associated with the firm, remaining with it for four years.

In 1897 he made his first important move, entering the Simplex Railway Appliance Company, a manufacturing concern which was competing with the Steel Foundries Company. The latter company bought out the appliance business with the understanding that its four officers, of whom he was one, would remain with the company for one year. Before the year was out, they had become the principal officers of the concern.

Mr. Lamont was made the first vice president of the company in charge of the operation of the plants, a position which he held until 1912, when he succeeded to the presidency. During the sixteen years that he held the office, he developed the company into a $60,000,000 corporation which makes steel castings of every character for railroads and shipbuilding and manufacturing plants.

His success was such that he attracted the attention of other great corporations, which sought his services in an advisory capacity. He became chairman of the board of the Griffin Wheel Company and a director of a large number of industrial and other commercial concerns, including the First National Bank of Chicago, Armour & Company, the American Radiator Company, Dodge Brothers, the International Harvester Company, Montgomery Ward & Company, the Illinois Bell Telephone Company, and the Chicago Daily News Company.

He also was a trustee of the University of Chicago and of its Art Institute, as well as of the Rosenwald Industrial Museum. He served as vice president of St. Luke's Hospital. Greatly interested in scientific research, he established the astronomical observatory of the University of Michigan in South Africa.

The only break in his business career came during the World War, when he was commissioned as a colonel in the Ordnance Division, serving so well that he received the Distinguished Service Medal.

Even in 1928, the year that was to mark the greatest change in his life, he gave no more attention to politics than did thousands of other business men. Although he did not even state his political affiliation in the sketch appearing in Who's Who in America he wanted Mr. Hoover, an engineer and business man like himself, to be the next President. With this wish gratified, he turned back to his own affairs, with absolutely no thought that he was about to become associated with the new Executive to whom the affairs of the nation had been intrusted.

His selection to head the Department of Commerce was as much a surprise to him as it was to the public at large. He did not have the slightest intimation that he was even under consideration. He has no idea how his name was brought to the attention of Mr. Hoover. He even let the newspaper of which he was a director get "scooped" on the announcement of his appointment. All he can say now is:

"I guess I more or less fitted into the Cabinet pattern that the President was making."

Picked for the Cabinet Post

His choice for the post, however, may not have come as a surprise to some of his business associates, among them Julius Rosenwald, chairman of the board of Sears, Roebuck & Company, merchant, and philanthropist. Mr. Rosenwald is known to have conferred with Mr. Hoover while the Cabinet was being made, but, regardless of whether he had a hand in the selection, there is an interesting story to recount that will give the reader an inkling of the esteem and respect in which the Secretary is held by those who have been in close contact with him for years.

A young man called on Mr. Rosenwald one day a year ago last winter and said he was representing John D. Rockefeller, Jr. He said that Mr. Rockefeller expected to win the contest he was making for control of the Standard Oil Company of Indiana and was casting about for a board of directors. He would appreciate any names that Mr. Rosenwald would care to suggest.

"The first man that comes to mind," said Mr. Rosenwald, "is Robert P. Lamont."

The young man rose, smiled, and said, "Thank you, Mr. Rosenwald, for the suggestion. Mr. Lamont happens to be my father-in-law."

The secretary, who married Helen Gertrude Trotter, of Chicago, in 1894, has two daughters, Mrs. Chauncey Belknap and Miss Gertrude Lamont, and one son, Robert P. Lamont, Jr., who served with the French forces during the World War and was twice decorated for gallantry.

Equipped for Instant Service

Firmly believing that "a man's judgment is no better than his facts," Mr. Lamont began acquainting himself immediately upon his arrival in Washington with the Department of Commerce, the statutory duty of which is to foster, promote, and develop the foreign and domestic commerce, the mining, manufacturing, shipping, and fisheries industries, and the transportation facilities of the country. Concentrating attention on its present organization, he found that it comprised twelve bureaus or divisions, employing sixteen thousand people, of whom five thousand are located in Washington and the rest are scattered all over the world. He learned as well that the normal annual budget was approximately $40,000,000—a total increased during the current fiscal year to $59,000,000 because of the cost of taking the decennial census.

The most important branch of the Department, from the point of view of business, is the Bureau of Foreign and Domestic Commerce. This bureau was created in 1912 to foster, promote, and develop markets for American products at home and abroad. It comprises several commodity divisions and technical units. Each is devoted to a special commodity or group of kindred commodities or activities, in charge of an expert selected with the advice of the trade associations and industrial interests concerned. The technical units are equipped to give advice on such subjects as commercial laws of foreign nations; transportation and communication in all parts of the world; customs duties of foreign countries, and import and export regulations; problems concerning foreign government loans, investment operations, and exchange; and detailed information on the import and export trade of the United States and of foreign countries.

The Bureau has 56 foreign offices, located in the world's chief commercial centers. The commercial attachés and trade commissioners in charge of these far-flung outposts of trade are trained business men and economists, thoroughly familiar with business conditions in their respective areas and with local commercial practices. They render assistance to American exporters by securing distributors and agencies abroad; by giving necessary data to American traveling representatives; by supplying special reports on definite markets for American goods; and by keeping the American exporting community regularly informed on current business developments.

Harris & Ewing

Mrs. Robert P. Lamont

The Bureau also maintains 78 district and coöperative offices in the United States, "service stations for business." They promptly transmit to American exporters the information obtained by foreign representatives and acquaint the public with all the activities of the Bureau. Important studies are also made in the field of distribution of commodities, market research, industrial markets, simplification of commercial practices, and numerous other vital problems in our domestic trade. The number of these daily services rendered to American business has increased from 700 to 13,000 in the past decade.

Equally interesting is the Bureau of Standards, which establishes and maintains the national standards of quantitative measurement; and attention naturally centers at the moment on the Census Bureau. Keeping pace with the times are the Radio Division and the Aeronautics Branch, both created in recent years. The latter establishes and maintains civil airways and aids to air navigation, makes and enforces air traffic rules, licenses aircraft and airmen, and collects and disseminates information pertaining to air commerce.

The Radio Division is responsible for the administration of the laws requiring radio apparatus and operators on merchant vessels. It supervises all commercial and private radio stations, requiring them to

(*Continued on Page 106*)

Exploring *the* HIDDEN EARTH

By GEORGE W. GRAY

AN EXPLOSION burst the floor of the Yellowstone Park on a recent summer day. In the Fairy Creek region a two-foot layer of solid flinty rock suddenly uprose over an area about a hundred feet across and popped skyward like bursting shrapnel. Through the vent steam and hot water spurted, bombarding the countryside with rock fragments and plastering the landscape with mud. For months the new geyser erupted twice daily, with detonations like gunfire, spewing nearly a million gallons of hot water during the three hours of each eruption.

To the sightseer it is only another wonder in a place where wonders are common. But to the men who study the earth it is a new hint of the mighty forces at work down beneath the skin which covers the rocky muscles of our restless planet.

How far down is the source of this heat? When and how were its fires kindled? What keeps them burning?

Northwest of Yellowstone is the Lewis range of mountains. Millions of tons of old sedimentary rock—dating back to a time when, geologists say, a long neck of shallow sea stretched through the continent and joined the Arctic Ocean to the Gulf of Mexico—are here found more than a mile above sea level. Not only that, but the rock formations show that the mountains have moved eastward more than seven miles.

What upraised the sea beds into mountains, and what thrust the mountains over Montana's plains?

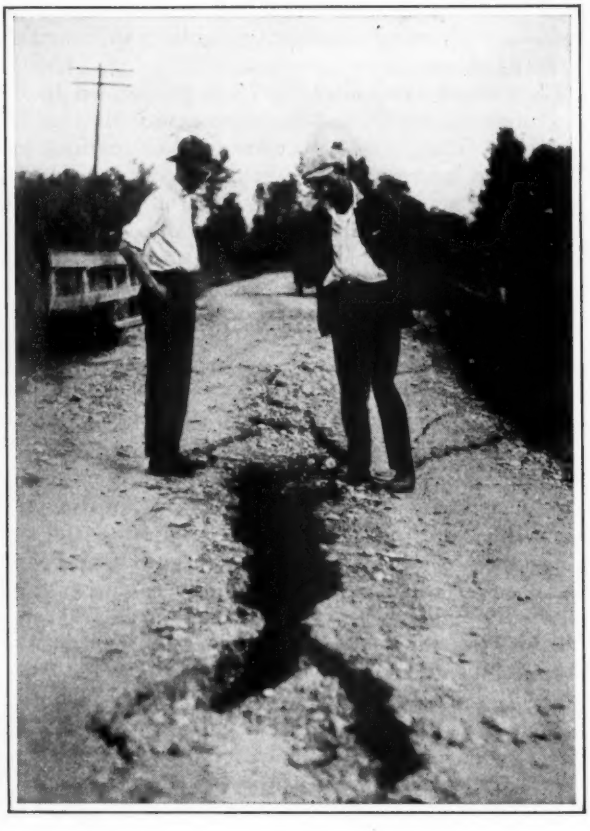
Passing westward we arrive at the Pacific Coast, where a recent geodetic survey shows some strange shiftings of the land. Point Reyes Lighthouse, just above the Golden Gate of San Francisco Bay, is ten feet north of its position as determined by a similar survey thirty years ago; whereas near-by Point Arena is more than seven feet south of its former latitude. The position of Mount Hamilton, the site of Lick Observatory, has changed nearly five feet southeast.

Why these changes? Why is the Lake Superior region slowly tilting southeastward? Why is southern Denmark sinking, and why are the Baltic coasts of Sweden and Russia lifting? Why did a new island rise in the South Pacific west of Krakatoa in 1928? Indeed, why is there any dry land at all, since the rivers of the world every hour of the day carry countless tons of land material down to the sea?

"The answer to all these questions lies inside the earth," said Dr. William Bowie, geodesist of the United States Coast and Geodetic Survey, when I visited his office in Washington recently. "It might be called, with truth, the hidden earth," continued the man whose job it is to measure and map the globe, "for by far the greater part of it has never been seen. With all his mining, tunneling, and boring, man has never reached much beyond a mile below sea level; yet to the earth's center the distance is nearly four thousand miles."

Sir Charles A. Parsons, the eminent British engineer, has proposed the sinking of an experimental hole to a depth of twelve miles. He estimates that a shaft could be put down to that depth in the course of eighty-five years at a cost of $25,000,000.

More recently Dr. Harlow Shapley, of the Harvard College Observatory, made an appeal for such an excavation in the interests of science. "These Plutonic



A fissure in a Montana road caused by an earthquake in 1925. Five shocks of varying intensity were felt there that year. With the rapid growth in the number of seismological observatories, scientists express the hope that means will in time be found to forecast such disturbances. Volcanic eruptions—there are 485 known volcanoes in the world—have already been successfully predicted.

Publishers Photo Service

The inner cone of Vesuvius immediately after an explosion. The mountain, originally a volcano on the sea floor, rose to its present height either by upward growth or a sudden upheaval. Instances in which submarine volcanoes have formed islands are known in our own time.

laboratories, fully equipped with modern scientific apparatus—some of which would have to be specially designed—would contribute to our knowledge in a dozen important fields in geophysics and astronomy," said Professor Shapley.

Another authority, John L. Hodgson, an experienced mining engineer in the Rand, has outlined a project for a shaft thirty miles deep. His project is primarily industrial—to tap the heat of the earth and use it to operate power plants.

The idea of harnessing the earth's heat is not new. There is a power plant in California which is operated entirely by steam from volcanic vents in the earth; it produces nearly five thousand horsepower. A similar development at Larderello, Italy, produces more than thirty thousand horsepower. But in both places the steam is derived from shallow borings, less than one fifth of a mile deep, in areas like that of Yellowstone Park, where the hot rock is near the surface. Mr. Hodgson's thirty-mile shaft would involve many unknown problems.

You may wonder why the Coast and Geodetic Survey should be interested in the interior of the earth. The function of the Survey has been described as that of "keeping the United States pinned down." Its engineers and cartographers make the official surveys

and charts which define positions of places in latitude and longitude, locate shore lines, and determine depths below and heights above sea level. All this would seem to require only surface measurements.

"But the more we study the surface of the earth," explained Dr. Bowie, "the more are we convinced that its face is being molded and remolded continually by unseen forces at work beneath the surface. Our planet is not merely the globe of star stuff we see—frozen rock covered with a thin film of ocean, broken here and there by continents and islands. It is also the medium of generation and communication of mighty forces—magnetism, gravitation, pressure, heat, and radioactivity. All these forces can be brought into the laboratory and can be tested and measured; but in the earth we find them on a gigantic scale far beyond anything that we can generate artificially."

A smoke ring projected from the crater of Mt. Etna, a most unusual sight and one rarely photographed. It is like a huge puff from the lips of a giant.

We live on a whirling magnet, and the source of its magnetism is an unsolved mystery. Perhaps the metallic core of the earth is magnetized; perhaps the rotation of our globe on its axis makes it a huge electromagnet; perhaps the real cause of terrestial magnetism is undreamed of by our present science.

Certainly the earth is the largest magnet of which we have experience, and it is continually puzzling us with riddles. Why does the compass needle deviate? In the United States there is a crooked line, beginning just north of Savannah, meandering across South Carolina, North Carolina, Tennessee, Kentucky, Ohio, Indiana, Michigan, and passing a few miles east of Marquette into Lake Superior and Canada. This erratic line, which is continually changing, is the line of zero declination. Anywhere along this line the compass points to the true north; everywhere else in the United States the needle deviates.

Thus, if you consult the compass in San Francisco you must allow for eighteen degrees' variation to the east. In New York the variation is to the west, eleven degrees; ten years ago it was $10\frac{1}{2}$ degrees. A gradual shifting is going on continually all over the earth, sometimes in one direction, sometimes in another, but nowhere uniformly.

A striking example of reversal is given in the records of Boston, Mass. In 1670 the compass needle in Boston pointed eleven degrees west of north. By 1785 it had moved back and was only seven degrees west. Then it reversed, and now is fourteen degrees west and still moving in that direction.

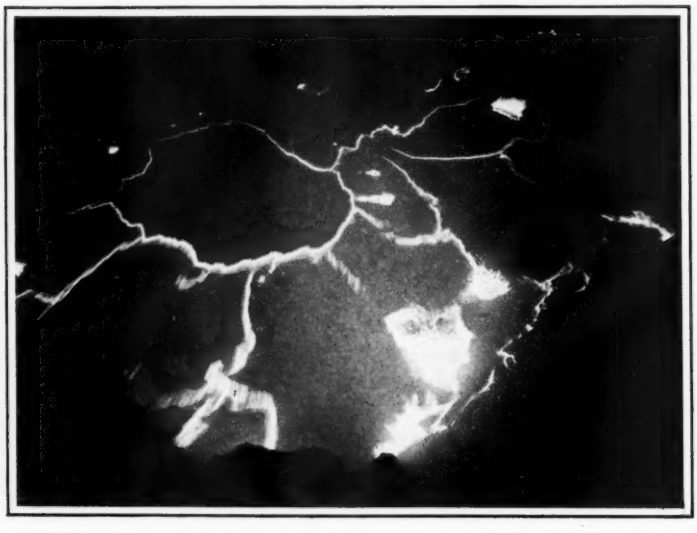
Some authorities believe that terrestial magnetism is related in some way to that other mysterious force which reaches out from the earth—the force of gravitation.

This latter force is even more universal, for whereas magnetism affects only certain metals, gravitation affects all bodies. It has been computed that the gravitational force existing between two steamships of fifty thousand tons, such as the Leviathan and the Majestic, amounts at a distance of one hundred feet to a force of about forty-five pounds.

A Mountain Under Water

The gravitational influence of mountain masses is quite perceptible. When the United States geodesists were making a survey of Porto Rico they found that at San Juan, on the north shore of the island, the plumb line did not hang at right angles to the general surface of the earth but inclined slightly to the southward. When the surveyors got around to Ponce, on the south shore, the plumb line again showed a deflection, in this case northward. In both instances the shift was toward the land and away from the ocean. The observed latitude at Ponce was too small and at San Juan too great.

The reason for this is easy to understand when you know that Porto Rico is really the top of a great undersea mountain. The ocean is precipitously deep both north and south of the island. Now, the crustal rock has more than two and a half times the density of water, so it was in obedience to the law of gravitation that the plummet inclined more toward the



Looking into the crater of a volcano in Hawaii. The crevices and the blowholes through which livid fire shoots into the air may be clearly seen. Hawaiian volcanoes are generally well-behaved, and one may come close to them without danger. The entire Hawaiian archipelago is of volcanic origin and has at least fifteen large volcanic mountains—all extinct, however, with the exception of three—Mauna Loa, Kilauea, and Hualalai.

This mountain range in Montana, geologists find, has been pushed seven miles eastward over the plains by movements in the earth's crust. The pyramid in the foreground marks the Canada–United States boundary line.

rocky mass of the mountainous island than toward the lighter mass of the sea water. San Juan and Ponce were shown to be thirty-three miles apart in the north-and-south direction, but when the plumb-line readings were reduced the distance figured only thirty-two miles, so great was the deflection.

Different from gravitation, though produced by it, is still another force of the hidden earth—the internal pressure. Near the center of our globe this pressure of overlying material reaches forty-five million pounds to the square inch. Can you visualize that? A high-powered locomotive weighs about one hundred tons. Imagine twenty-two locomotives stacked into a huge pile and supported on a single pin one square inch in cross section. That is the weight that presses continually on each square inch of the earth's center.

And yet the earth does not burst. The very force that produces this titanic pressure holds all together, for the main effect of gravitation seems to be to pull everything toward the center of the earth. Even the liquid mass of the sea is held tenaciously in the grasp of that eternal pull toward the planetary center. The intense heat of the interior would tend to expand and burst it but for this same overruling power of gravitation, which weights down and seals the hot central core with millions of tons of pressure.

Paraffin Harder Than Steel

But why is the earth hot?

The crust is losing heat continually, but there seems to be an almost perpetual source of energy in the radioactivity of thorium and uranium, which are abundant elements in the crustal rocks. Many authorities attribute the heat of volcanoes, geysers, and hot wells to the presence of radioactive elements. But the heat of the deep interior cannot be accounted for by this source, for specialists in this field find that radioactivity is confined to the outer crust. Presumably it becomes insignificant at a depth of about thirty miles.

Thermometers have been carried down into mines and sunk into oil wells and other deep borings, and everywhere it has been found that the temperature rises fairly steadily as the thermometer descends. The average of all tests that have been made is an increase of about fifty degrees Centigrade for each mile of descent. If this rate keeps up for the entire distance, the temperature at the center reaches hundreds of thousands of degrees. The temperature of the lava which pours out of the Mauna Loa crater in Hawaii is 1,100 degrees, but volcanologists believe that the source of this lava is only twenty to forty miles below the surface.

Harold Jeffreys, the English geophysicist, computes that at a depth of 450 miles the temperature is as it was when the earth was formed. This inner temperature is believed to be not less than 6,000 degrees—the surface temperature of the sun.

What 6,000 degrees of heat may mean we cannot demonstrate. The temperature of the electric arc is 3,400 degrees, which is about the limit our laboratories can generate and control. Nickel melts at 1,427 degrees, iron at 1,600, platinum at 1,710. A diamond, the hardest known substance, burns at 850 degrees; but we don't know what it would do if confined without oxygen and subjected to both the earth's central heat and its central pressure. Pressure may change the very nature of things.

Prof. P. W. Bridgeman, who has been experimenting with high pressures in his laboratory at Harvard University, reports some surprising results. Paraffin wax, such as housewives use to seal jars of jelly, when subjected to a pressure of 200,000 pounds to the square inch became harder than steel. When this hardened paraffin was forced against a piece of steel it caused the steel to flow, and eventually the paraffin punched a hole in the steel.

Then Dr. Bridgeman tried the pressure on soft rubber. The rubber hardened and cracked, and the steel which was being forced against it filled the cracks like putty. One would expect just the reverse—it would seem that the rubber should flow into the steel—but pressure indeed seems to change the very nature of things.

"One effect of the earth's interior pressure," said Dr. Bowie, "seems to be a solid earth. The evidence that we now have indicates that the globe is either solid throughout and of great rigidity, or that it is solid

The nature of the inside of our earth, much as we know of it, remains one of science's most fascinating mysteries. Volcanoes, earthquakes, geysers give us hints of the great forces working, sometimes not so quietly, just beneath our feet. Mr. Gray sums up the facts and advances interesting speculations.

almost to the center and with greater rigidity for the solid portion than if solid throughout.

"This is a new conception. Until recent years, the view generally held by scientists pictured the earth with a comparatively thin crust or shell of rock surrounding the great molten interior. It is hot enough to be molten—indeed, hot enough to vaporize any metal. And yet, because of the conditions as to pressure which prevail there, the material remains solid."

Fresh Data, New Conceptions

"Three kinds of evidence support this conclusion, and the first is that of earthquake waves. When an earthquake occurs in Japan, some of the vibrations come straight through the earth to write their messages on the seismographs in America. The earthquake sends out two kinds of waves. One, the compressional or longitudinal wave, travels through either solid or liquid material. The other, the transverse or distortional wave, is believed to go only through solid material.

"At all events, it is generally held by seismologists that a core with sharply defined boundary is necessary to explain the behavior of waves originating at a distance from a seismograph station of from one third to one half the circumference of the earth. Longitudinal or transverse waves, on reaching the sharp boundary of the core, are transformed into both longitudinal and transverse, but only the longitudinal can pass through the core. On emerging from the core the longitudinal waves are again separated into both longitudinal and transverse and may reach the surface in either form. This appears somewhat complex, but the assumption fits the waves actually recorded.

"This inner core, two thousand miles in radius, is only about one eighth the volume of the earth. These seismic waves prove, therefore, that at least seven eighths of the planet is solid. And the remaining eighth may also be solid—the fact that the transverse waves do not travel through it is not proof positive that the core is liquid. For the tremendous pressures in the core may change the physical characteristics of the innermost material to such an extent that it will not transmit those waves, even though it be solid.

"A second reason is supplied by astronomers in their records of the motions of the poles. It has been shown mathematically that only a solid body, as rigid as steel, could wobble in precisely the way that the earth wobbles. A liquid interior would produce an entirely different kind of spin."

Three Shells Incase the Core

"Finally, the ocean tides prove that the earth is solid. If the globe were not rigid, the gravitational attraction of the sun and the moon would cause vast tides to surge in the interior, the molten mass would heave and distort the crustal shell of the globe, and it would not be possible for the ocean waters to pile up in great tidal ridges as they do daily."

Dr. A. A. Michelson, of the University of Chicago, tried an experiment to see if he could detect any tide in the crust. He laid an iron pipe five hundred feet long in a trench, leveled it with extreme accuracy, half filled it with water, sealed it air tight, and covered it with earth. A window at each end enabled him to keep the water level under observation with a sensitive instrument. From these observations he found that there is a rise and fall of the crust of the earth which is greatest at the equator and has a value there of about one foot. But this tidal movement is only thirty per cent of what it would be in the case of a liquid earth, and from his measurements Dr. Michelson computed that the earth's rigidity is equal to that of steel.

And what is it, this hidden earth—of what stuff is it made? Two geophysicists of the Carnegie Institution of Washington, Drs. Williamson and Adams, have recently gathered together all known data on the subject—the evidence supplied by gravity determinations, by the speed of earthquake waves, by the composition of meteorites, and by other observations, both astronomical and geophysical. From these facts they infer that the earth consists of a heavy metallic core, ten times the density of water, surrounded by three shells.

The outer shell is mainly granite. This is the lightest of all the igneous or original rocks; and when the globe was still molten its lightest material naturally would float and be the first to cool. The granite gradually changes in density with depth, and at a distance of about thirty-five miles below the surface a region of heavy basaltic rock is reached.

This basalt marks the beginning of the second shell. It is the rock which flows from volcanoes as lava. It grows increasingly dense with depth. The second shell extends inward from the 35-mile depth for about a thousand miles.

Metal That Can't be Mined

Then begins the third shell, in which heavy rock is increasingly impregnated by metallic iron or a mixture of nickel and iron. This layer is between one thousand and fifteen hundred miles thick.

And this brings us to the fourth and innermost section, a core of what we believe must be nickel and iron. The geophysicists compute that this core must be at least three thousand miles in diameter, possibly four thousand.

Even the smaller estimate entices the imagination. A solid ball of iron and nickel three thousand miles in diameter! What a bonanza it would be to our mining kings who are able to coin millions, even billions, out of these pin pricks that we call mines! If the three layers were peeled off, the core alone would make a sizable planet, much larger than the moon and more than eight times as massive. Indeed, the core of the earth is nearly as large as the planet Mars.

But if the earth is more rigid than steel, what shall we say of the mountains? Why should the spherical surface be distorted into ocean hollows and mountain heights? Let Dr. Bowie answer.

"The original distortion came, I believe, at the time when the material which formed the moon was torn out of the newly cooled crust of the earth. The oceans now occupy the scars left when the earth was thus peeled of much of its original surface stuff, and the continents are fragments of crust that remained.

"It is a remarkable fact that the underlying rock of the Azores, the Philippines, the East Indies, and other

(*Continued on Page 92*)

"OLD EVERLASTING"

By DONALD WILHELM

Author of "The Battle of the Laboratories," "Facts or Failure," "The Story of Steel," etc.

THIS is the story of Old Everlasting—granite—the most enduring of all materials!

It really ought to begin, this story, some millions upon millions upon millions of years ago, when nature first went into the manufacturing business and out of a fire mist made this planet whereon we dwell. And it really ought to end some millions upon millions upon millions of years henceforth, when granite will be the last—perhaps the only—memorial of this happy day in which we live.

But let's begin, instead, midway between these eternities.

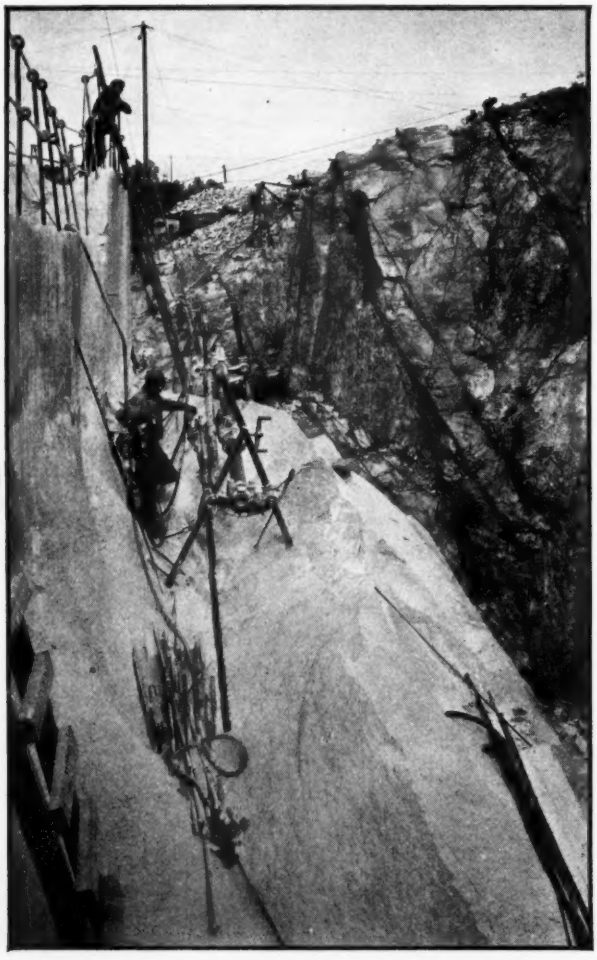
Let's begin by standing on a little platform on a mountain high above a majestic valley sloping away toward Lake Champlain. But here, instead of looking across that valley to the eternal hills beyond, or up, once more to note how high the sky is, let's look *down*, into the bed of a vast man-made pit that resembles a pumped-out sea.

'Way down there, in the bed of this pumped-out sea, there are men working, looking no bigger than busy ants. Also, wherever ladders climb and cling to the precipitous faces of these world-famous quarries, there are other men moving about, like Alpinists, or perched on ledges or wooden landings busily operating drills, or striving in other ways—with hardly a sound from their efforts heard above—to wrest granite from the grip of Mother Nature.

She *hates* to surrender this granite—the hardest of all commercial stones, the cousin of the diamond, the ruby and the sapphire—perhaps because it *is* Rock of Ages; perhaps because, among all of the many granites quarried, it *is* unique!

In fact, until a century ago, she *defied* Man to take it from her, surrendered but little of it—that little mainly for millstones after the War of 1812 had blocked our French supply—and surrendered that little grudgingly! And even half a century or so ago, when hand drills and sledges and muscular power were still Man's main quarry tools, when he had to resort to levers or explosives, to wooden wedges driven into surface or other cracks and left to swell or to water left in drill holes to freeze, she still surrendered but little. Indeed, so difficult was this stone to quarry, so inaccessible was it for purposes of transportation, so arduous was the problem of getting it down what is now called Barre Hill, the poor pasture land above this precious and inexhaustible supply of stone was once sold for taxes!

Today, as we can see



Heavy compressed-air drilling and broaching machines high up above the Rock of Ages quarry beds. In the foreground lies a 30-foot drill bit with its odd "hog's foot" teeth. Such bits are revolved in drill holes and have hollow centers through which the powdered granite escapes. Under this drilling and broaching machine a "cut" may readily be seen.

at a glance, Man, the Ingenious One, does better!

Thanks, in the main, to power!

II

HERE, a little way behind us, is a power house with two huge boilers, much else; higher up, nearer to hand, another boiler; higher still, yet not so high as the tip of the highest of many busy but patient derricks, is a third.

And down there in the busy arena called the "pit," you see metal pans—"3-point-suspension grout pans," they are called—being filled at many points with waste, swiftly transported many rods on horizontal cables, there to be picked up by derricks high above, lifted, swung, dumped into "side" or "end-dump cars" whose tracks run to, and even along, the very edge of this awesome chasm.

You note how swiftly these grout pans are lifted by "3-speed hoists."

Next you note a block of granite seemingly small 'way down there. You see a quarryman run a noose of cable about it. You see it lifted, observing that it looks bigger when suspended in mid-air, bigger still when swayed past you, to be set down, gently on a flat car.

Now—as if to show you that here in these Rock of Ages quarries these resourceful Vermonters know how to stage a show better than David Belasco's best—you see another group of quarrymen adjusting a single strand of cable to a block of stone that even from on high looks bigger than a Toonerville trolley. Down there someone in authority waves a signal, the workmen move away, a derrick man in his pulpit near you makes a sign to the operator of a hoisting engine over the way, and up, and up, out of the lap of Mother Earth, you watch that huge stone lifted—watch it anxiously, wondering how the 110-foot mast of Oregon fir, "sway-braced" though it is, and its 90-foot boom, can endure this unendurable test.

It does!

Yet you heave a great sigh of relief when it sets its burden down on a flat car as gently as a sweet-natured mother sets down a hot dish!

It is longer than the car itself, this block of perfect blue-gray stone without a stain or irregularity in it. It is forty feet long, four feet high, four feet thick. And since a cubic foot of granite weighs, our guide tells us, approximately 180 pounds, this piece weighed, I judged, 115,200 pounds—fifty-eight tons!

"I bet," now I ventured to the quarry superintendent, "that's the biggest block *you* ever got out of there!"

He pondered, as Vermonters will; spat, like a proper quarry superintendent; answered with the twang of a Calvin Coolidge, "We've taken 'em out twenty tons bigger!"

Now I pondered, as reporters will; doubted, like a proper New Yorker; countered with a grin: "Oh, yeah!"

Then he looked me over, I looked him over, doubted no more and asked, "Then what *is* the limit?"

"The railroads set it," he replied, "in their durned regulations!"

"But, man alive," I snorted, after mature consideration, "how in the world could you ever get a piece as big as that loose from the bed down there, let alone getting a cable round it?"

Then I learned, though not from him because he was shinnying down a ladder into the depths, that not so many years ago—when the picture at the beginning of this article was taken of hundreds of men sitting on one block of granite—in the middle of a cold night when nearly all good New England folk were in warm beds, those in the villages hereabouts were wakened by an explosion. Concluding at last, "Folks must be blasting up in the quarries!" they went to sleep again.

But the next day they learned that in these Rock of Ages quarries the biggest single block of stone of record anywhere in the world had been wrested from Nature. Two hundred feet long, eighty feet wide, twenty-four feet thick, its estimated weight was 65,000,000 pounds! Obviously it couldn't be lifted; indeed if it had rested on solid level ground all of *all* kings' horses and all of *all* kings' men, with all the tractors ever made by Mr. Ford, couldn't have budged it one inch! When broken up it filled 1,728 cars, was worth nearly a million and one-half dollars. So the wonder is that when it toppled over, into the bed below, it didn't keep right on going, all the way to China!

So I asked also about that.

And learned that, so far as can be ascertained by the use of diamond exploration or core drills, this unequalled deposit of granite extends downward many

Advertisement

thousands of feet, is probably inexhaustible, if geologists in their story of the rocks are accurate at all.

III

GEOLOGISTS tell us that granite is one of Nature's oldest and most trusted materials, even as New England is one of the oldest geological areas in the world. They say that the loosening of 65,000,000 pounds of granite in a single block is a little less than nothing at all when compared with what took place when Nature was manufacturing New England, millions upon millions of years ago. They insist that long, long ago, just a few million years before, or perhaps after, New England was covered with glaciers, things were comparatively lively hereabouts; that all sorts of important events were happening below the crust of the earth, and that amidst all the mêlée then going on, Nature was busily making granite—making it under pressures that even a *very* young engineer couldn't possibly estimate in terms of a cubic inch!

At any rate, so goes the story of the rocks, she made a large number of materials we now deem important, including granite, which is an igneous as distinguished from a sedimentary material such as marble or limestone; and having made what we call granite by combining quartz, feldspar and mica, used it for some of her biggest and most spectacular jobs. She used it, thus, to bear the Earth's biggest burdens; granite is presumed to be the material underlying all others. She used it, also, we are told, to jack up, thousands or tens of thousands of feet above sea level, such mountain ranges as the Alps, the Rockies, the Appalachians and, of course, the Green Mountains of Vermont as well. And, to boot, just for the fun of it perhaps, she heaved this igneous or fire material up through openings here and there, pumped molten granite out of volcanoes, overlaid all other deposits with lava that, by the by, some native sons of Vermont uncovered high up where the Rock of Ages quarries now thrive.

Here now we find fine gray granite in a supposedly inexhaustible deposit of unique excellence and uniformity. Here it does *not* lie in strata but in the form of titanic boulders, as elsewhere in the Barre district. In other words, as our pictures show, it lies in segments, many of which exceed 100 feet in height or thickness or both, between beds—or "lifts," as the quarrymen call them—and is uniform between those beds or lifts.

It lies "between beds," which is fortunate! Because the quarrymen can accordingly take advantage of its plight and save themselves from a vast deal of horizontal and other drilling.

IV

DRILLING is the central operation in quarrying granite. And since drilling was infinitely expensive and laborious when there was no power practicable save muscle power and the wasteful power of high explosives, the exploitation of these quarries remained

Part of the bed "of a vast man-made pit that resembles a pumped-out sea." Note in upper center "men working, looking no bigger than busy ants." From all over America, and even from abroad, travelers come to see the quarries—and are welcome!

Advertisement

"Bigger than a Toonerville trolley"—and quite a bit heavier —a block of granite being brought "up, and up, out of the lap of Mother Earth." Many of the finest memorials—and certainly the most enduring—are carved from such blocks. Workmen carefully trained in Safety First "stand back" when a single strand of wire rope proceeds to lift out such a block of Rock of Ages granite.

comparatively small in scale until the advent of pneumatic tools. Today, the huge compressors—two of the largest in existence are in the Rock of Ages central power station—furnish through a system of big and little pipes, like a city water system running everywhere, a plenty of pneumatic or compressed-air power.

So now, from the vantage point sought by travelers coming to see these quarries from all over America and even from abroad, you see the quarrymen here using heavy drilling machines, illustrated herewith, and scores of individual jack-hammers, for use where drilling machines cannot easily be mounted or are not required.

Skilled by long experience, the Rock of Ages quarry superintendent or one of his numerous foremen, selects for cutting a segment of granite in point. Next he indicates to his workmen the line along which a cut—or two or three cuts, either vertical or horizontal—will best loosen the stone to be removed. There, then, the drillers go to work, starting with short drills, working toward others as long as thirty feet, until, all in a row, there are holes a few inches apart the entire length of the line or lines marked. Usually, when all of these holes have been widened by use of "broaches" or other special tools, steel wedges are driven into the cut or cuts—are driven in with sledges, little by little along the entire line or lines, much as one uses wedges to split rails out of logs.

Finally something goes "pop" and, by that sound, Nature admits she has been outwitted by Man.

But sometimes she is stubborn!

Then, when all other workmen are safely out of the quarries, at night, a picked crew pours powder into a cut until a third or half of it is filled, arranges wires, in series, provides an air chamber, packs in sand. Next, gun-powder is poured into the cut, the two loose ends of wire are carried off a safe distance, and when all is ready a battery fires the powder charge. Now, Nature usually gives up, knowing there is a lot more powder in reserve!

Sometimes, though, it is wasteful and unnecessary to make a continuous cut and to use gun-powder, since the rock under attack is blemished, stained, or is merely waste standing in the way. Then dynamite, with its shattering, destructive effect, is used, and a shower of fragments instead of one solid block of granite is the result.

In any case, once a piece of granite worthy of Rock of Ages high standards is loosened, if necessary levers or jacks are employed to make it ready for the cable noose that is to bear its weight on the ride up to glory! Part of a block may be perfect, the rest not quite perfect, in which case instead of being set upon a flat car ready for its eventful journey down the mountain to Rock of Ages manufacturing plants located on the way to market, it is set down eventually in a yard where skilled judges of granite behavior separate, again with power tools, good from bad. Here high standards imply necessarily large waste; in other words, though the granite in these quarries is famous all over the world for its amazing excellence and uniformity, *for every ton of certified stone removed more than eight tons* (before the day of power tools the proportion was even higher) *is dumped* into side and end-dump grout cars that are shunted off to grout piles almost as large as small mountains in themselves.

It is something taken very seriously, you see, by the folk up there on Barre Hill where these quarries are as well as in the manufacturing plants in the valley below—this ideal: That Rock of Ages granite, having been manufactured by the hand of God in processes requiring millions of years, shall go forth no less than perfect.

"It's for us to keep the faith," this ideal suggests. "For Rock of Ages granite isn't like most of the things we make from Nature's materials. It isn't like the food we eat, the clothes we wear, the cars that we run only a few years at most. Nature took millions of years to prepare this stone for us—to make it everlasting—to make it endure longer than any other material we have, infinitely longer than anything alive, longer by far than any metal, as long as grass grows and rivers flow down to the sea!"

V

FROM the quarries more than half a mile above sea level Rock of Ages granite has to be transported down to manufacturing plants in the valley below—*down grade more than 1,000 feet* in two miles as the bird flies and four, by the most direct surface route. That's why, no doubt, before the days when Power revolutionized transportation, and quarrying too, tradition

Advertisement

has it that the pioneers used to admit Nature knew her business; that she put this deposit of granite "up there on purpose"—to make a test of its desirability and a challenge to those who aimed to wrest it from her.

As far back as a century ago New England ingenuity essayed to answer to that challenge, to meet it in various ways.

First, some granite was removed—even before the demands for millstones—for use in cobblestones and in the sills and hearthstones of a few old Colonial homes. But whole decades rolled by before there came the first large demand for Barre granite—for use in the new State Capitol of Montpelier, approximately nine miles from the quarries, via roads not passable for heavy loads save during the coldest winter months. Labor was plentiful; granite cutters were available at one dollar a day! Funds at hand were ample; for the unique value of Barre granite was first clearly established by the building of the Capitol, *itself*. And up on Barre Hill, fortunately, the 23,000 tons of granite needed (less than a day's production of finished Barre granite today) lay close to the surface. So the problem lay with teaming—it was the resourceful teamsters of the day who met the challenge this time, and calculated thereafter that such a challenge *should never* be met again!

They met it, in mid-winter, in temperatures ranging down to forty below zero, by an epic achievement of their own, else Vermont's State Capitol would not now remain, despite assaults by fire, flood and other of the elements, one of the finest expressions of American architecture. But they had trouble enough!

"For the only way to get to the quarries in those days," says an old record, "was to go to the upper village and up Stirling Hill, which is very steep and on the east side (of the mountain) and near a very deep gulch."

Then—this:

"It was necessary, in order to get down the hill safely with our heavy load of granite, to chain or clog each runner and to have an extra pole to each of our sleds that the four horses could help in holding back our heavy loads, and we were very thankful when we were safely at the foot of the hill!"

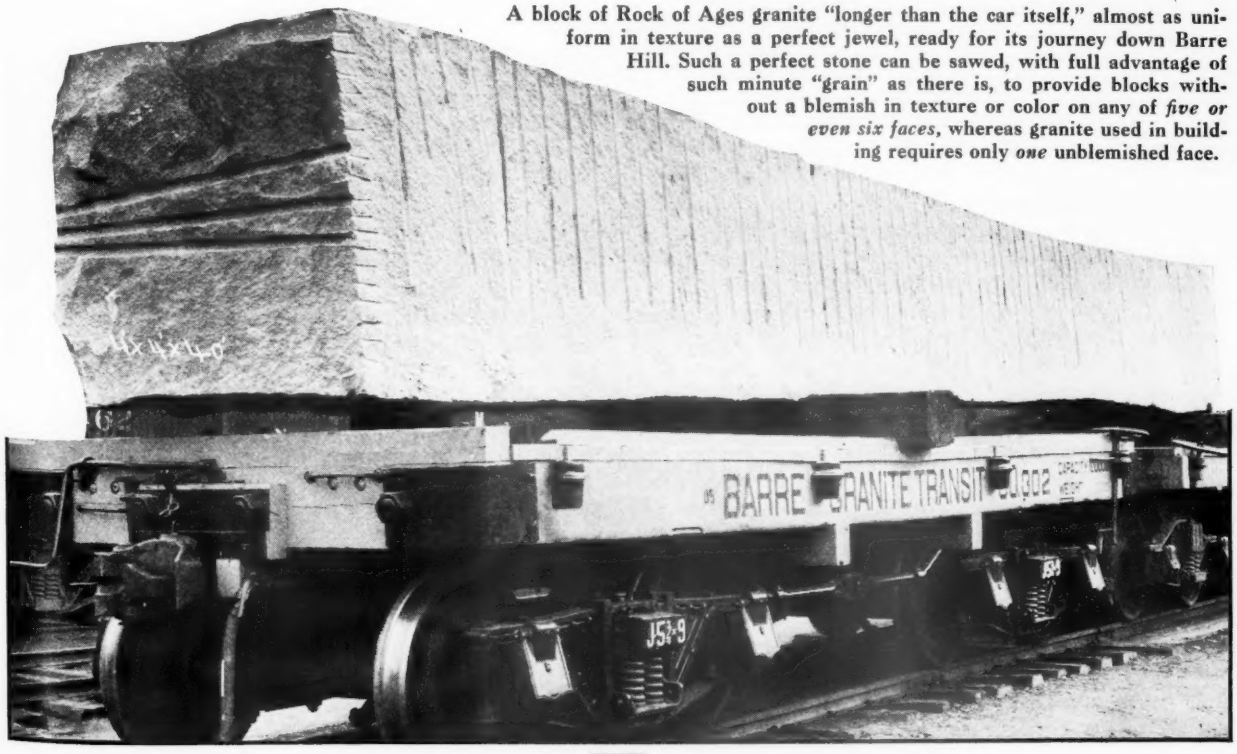
Then came, thanks to the architectural beauty of Vermont's Capitol, another challenge—when the great granite slab quarried for the roof of the Stanford Mausoleum, at Menlo Park, California, had to be brought down to the railroad that had been built to Burlington. It took two weeks, it is said, in mid-winter, to get that stone down the first four miles, by use of heavy rollers and a long string of horses often hitched to the rear of the burden instead of the front!

But again New England courage won through. And so there was hastened the day when the railroad was extended to Barre in 1875 and, in 1888, to the quarries—thanks to the engineering ability of Ward Crosby, a celebrated railroad builder, and the construction ability of "Jim" Boutwell, a Rock of Ages pioneer. Still it reached the quarries and is practicable now only because of a series of switchbacks that bring a train safely down to the valley in zig-zag or, as an aviator would say, in side-slip fashion.

So, now, safely and systematically, we can go along with a trainload of granite to the ten Rock of Ages manufacturing plants in the valley, to see how Man does his part in fashioning and finishing it for use in God's acres, in statues and other memorials, in mural and other architectural plans.

VI

BARRE is the "Granite Center of the World" not merely because it produces more and better granite than any other center in the world, not only because Nature gave it an endless deposit of a stone that has come to be almost semi-precious, but also because it has



A block of Rock of Ages granite "longer than the car itself," almost as uniform in texture as a perfect jewel, ready for its journey down Barre Hill. Such a perfect stone can be sawed, with full advantage of such minute "grain" as there is, to provide blocks without a blemish in texture or color on any of *five or even six faces*, whereas granite used in building requires only *one* unblemished face.

Advertisement

In its quarries Rock of Ages is "cleft" on occasion in this way, by the use of drill holes, large or small or both, into which steel wedges large or small are driven. Similar methods, applied entirely by hand, had of old to be used in cutting granite in the manufacturing plants, so that stones could not advantageously be shaped to allow for carving of the cross grain. Now saws are used. Note picture on next page showing a modern granite saw "without teeth."

long been and is a gathering point for the finest granite craftsmen in the world.

First the native Vermonters, with the help of some "down-State folk" (from Massachusetts and Connecticut), undertook to capitalize these quarries. To help them, and to provide high skill on the manufacturing side, there came a wave of proud Scotsmen, largely from around Aberdeen, Scotland, the granite center of the British Isles. These shrewd and industrious folk combined their talents with the organizing ability native to the Vermonters, and now, in many instances, you find them in command of manufacturing plants that have made granite history.

After them, in part because of the ever-increasing American demand for labor, came a wave of Northern Italians—big blonde men, mostly, with an instinctive "Roman" love of fashioning beautiful things. These devoted folk brought traditions of their own and made their own contribution to the future of Barre.

Later on there came a smaller wave of Spanish immigrants, who also had their contribution to make.

Finally came an infusion of French Canadians.

So we get the picture of old Mother Nature going to work countless ages ago to provide a material the exact like of which does not exist anywhere else in the surface of this earth. Then, high up on Barre Hills and in the valley below, she gathered craftsmen from many nations to make their contribution to the technique of beautifying this imperishable material, this aristocrat among stones.

At first the shaping and finishing of granite was virtually all done by hand, with muscular power only. Today, though the old time skill-o'-hand is still reflected in the granite that Barre provides the rest of the world, the power used is no longer power of muscle only. Chisels and tools typically like those used of old *are* employed, but the power behind these chisels and tools, in all the finely appointed plants serving the Rock of Ages Corporation, is compressed air. In them, too, numerous traveling cranes do all the lifting and shifting of material. And where of old there was no way, save by the use of hand drills, to split a large piece of granite, and this method was wasteful and did not provide for the most desirable use of the grain in the stone, today we have mechanical saws. And where a generation ago virtually all finishing and polishing of material was done by hand, today machines called "Jenny Linds," along with many others, are commonly used. Therefore, while a generation ago a granite manufacturing plant was a large shed circular in shape with a central derrick or crane serving its many doors, today Rock of Ages granite is fashioned and finished in well-lighted plants of characteristic modern manufacturing type and design.

When a piece of granite in the rough is brought to one of these plants, the first application of skill is the only one which today is achieved precisely as it has always been done in this, probably the oldest manufacturing trade on earth. This operation is called "winding," which means, simply, that first of all, typically by the use of two "plumb spots" established with a chisel to provide a base for the use of square and rule, the craftsman sets out to make sure that his measurements are dimensionally sound, "before he takes the stone out of wind," i.e., shapes it, by use of power hammers and chisels, by sawing or by virtually any of the functions carpenters and cabinet-makers perform in shaping wood.

To *saw granite*—a stone much harder than any other with which sculptors and builders have to deal—seems impossible; *was* impossible until a few decades ago!

Now, though, there are four different types of granite saw used, and in one instance exclusively used, in Rock of Ages manufacturing plants: The gang saw, the Chase saw (the invention of Elroy A. Chase, now director of design and research of the Rock of Ages Corporation), the rotary saw (first applied in Barre to cutting granite in the plant of the Perry Granite Corporation, now a Rock of Ages division) and, finally, the carborundum wheel.

None of these saws, oddly enough, has teeth, in the sense that a wood saw has teeth, unless that might be said of a carborundum wheel.

Instead of having teeth, like the typical wood saw, the granite gang saw that we find in use this day in the plant of Barclay Brothers—a company reflecting the skill of three generations of Barclays and now a division of the Rock of Ages Corporation—is using two blades of low carbon steel about twenty-five feet long and one inch thick. Spaced well apart—for they can be moved laterally and some granite gang saws carry as many as ten blades—these blades are attached to draw

Advertisement

bars in a large frame beneath which one block, or more, of stone is secured. Accordingly, when in operation, these saws move back and forth somewhat like the driving arms on the side of steam locomotives save that they work horizontally, with tall pressure screws automatically pushing them down, hard against the stone, deeper and deeper into the cuts being made.

The Chase granite saw, the invention of the president of the E. A. Chase Granite Company, Inc., and vice president of Phillips & Slack, Inc., both of which are now Rock of Ages divisions, is unlike the gang saw, which makes three or more slabs in one continuous operation and cuts at the rate of four inches an hour. Instead of having two or more parallel blades continually driven horizontally with the granite block or blocks held stationary, the Chase saw, as our illustration shows, has nine short blades working in tandem, which, in swift sequence, continuously strike into *one* cut at somewhat the same angle used in striking with an ax. Moreover, the block of stone being cut—or there may be many joined in a continuous line and they may be large or small—rests on small cars, perhaps a whole train of them, automatically moved forward while these nine blades bite through two and one-half inches of stone a *minute*.

Each of these saws—the gang and the Chase—has advantages. In the first, three or more slabs are made in one operation but there is a definite limit, corresponding with the size of frame and length of blades, to the size, and notably to the length, of the block of granite to be cut. But the Chase saw implies no limit, at least in the length of cut to be made, and can readily be used, as again our pictures show, to cut small pieces, to crop off ends of small pieces and to eliminate any time lost in operation, since the granite to be cut can be made ready without cessation of sawing. Accordingly both types of saw—the gang and the Chase—can on occasion advantageously and economically be used.

The rotary saw—the third type—is different from either the gang or the Chase in that it is circular and more nearly resembles the familiar toothed cutter seen in timber and lumber mills. Yet this rotary saw, like the gang and Chase saws, has *no teeth*.

Therefore you wonder. "How in the world can saws without teeth cut granite, the despair of any except a sharp tool driven hard?"

For answer:

Instead of teeth, under the comparatively thick steel of all these saws tiny round fragments—"shot," it is called—of steel are used; are continuously fed into the cut or cuts, under the saw or saws, by shovel or automatically, along with a continuous flow of cold water to keep the saw itself from burning up. In other words, this shot constitutes the teeth of these various saws, is constantly ground up, constantly renewed, so that the net result is much like that of the familiar carborundum or kindred wheels which, by the way, are also

The Chase granite saw, exclusive with Rock of Ages. Sawing granite with steel saws having *no teeth* is achieved by this saw, by gang saws, rotary steel saws and carborundum or kindred wheels. The Chase saw is the fastest. Here the blades, in tandem, may be seen meeting a variety of granite shapes sealed together atop a traveling platform. This platform is composed of small cars, like "hand cars" on a railroad, which are moved forward automatically and finally transferred by traveling crane back to their starting point so that continuous operation, the essential of mass production, is possible. Note blades.

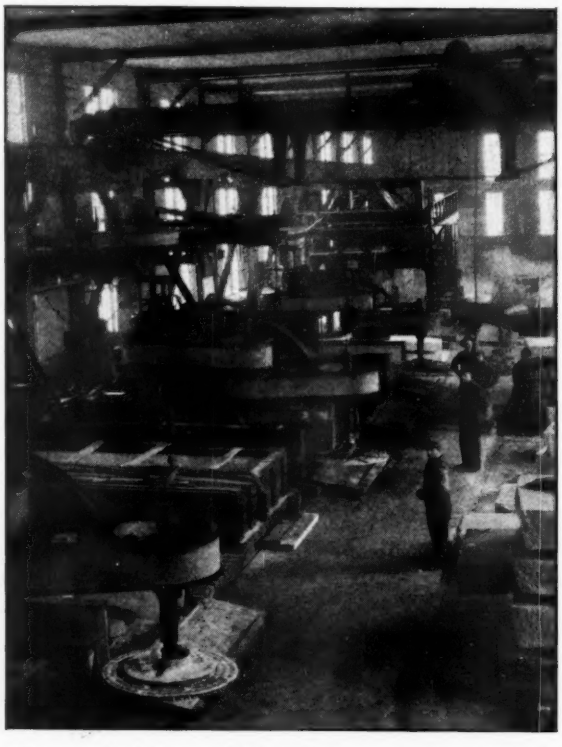
Advertisement

used in cutting Rock of Ages granite only when continuously cooled with water.

VII

WHEN the slab or other piece of granite emerges from cutting by any of these four types of saw, its cut surface is more or less rough—rougher, by the way, when a gang saw is used than when the Chase saw is used—and so must be subjected as a rule to such smoothing and polishing as a cabinet-maker using wood can achieve by using a plane, sandpaper or steel wool, pumice and perhaps some other rubbing material such as rotten-stone. But in the granite industry the typical substitute for these familiar and pleasant processes of a cabinet-maker is the use of machines here illustrated, called, oddly enough, "Jenny Linds."

Sweet-voiced Jenny Lind was, as Robert Burns described her, very feminine, of course! But these Jenny Linds employed in the Granite City, to beautify the hard surfaces of granite, are *noisy*—particularly in the first of these three of these usual operations used: "ironing," "emerying" and "buffing." But since Jenny Lind was very feminine, I suppose that in the thrifty traditions of "Old Scotia" she was supposed at times gladly to have got down on her knees, along the track of various masculine footsteps, there, with plenty of soap on the floor and with much vigor, to apply a hand mop energetically, in circular fashion. At any rate, these Jenny Linds in Barre are mechanical reproductions of busy human figures smoothly and in some plants continuously, but without any song save their own, applying in vigorous circular fashion the equivalent of mops—metal disks.



"Sweet-voiced Jenny Linds," in a row, in the finishing department of a Rock of Ages manufacturing plant. These ingenious machines are "mechanical reproductions of busy human figures smoothly"—and in some plants continuously—"applying in vigorous circular fashion the equivalent of mops—metal disks"—one of which may be seen in the foreground at rest, with the workmen, while this picture was taken.

These disks or "mops," however, are made of concentric rings of wrought iron at the largest approximately a yard across. Rings are used to form them instead of a solid, weighted piece so that, in the first operation—ironing—shot can be fed down through them, and in the second operation, emery or other grinding compound, while the mop as a whole is mechanically pressed down upon the stone, kept spinning at speed approximating 160 revolutions a minute. But in the third operation—buffing—instead of a disk made of rings with odd spiral or other formation on the under side, felt or similar material is used instead of iron, and putty powder or other polishing compound is used instead of shot or emery. Also it is to be added that though as a rule these Jenny Linds operate on granite that is sealed rigidly with plaster of paris in beds, or "bins," surrounded by low batter boards, wherein the stone is leveled before operations begin, Chase patents now cover improvements whereby a piece of stone of any shape can be set in a bin, the mop or wheel adjusts itself to the stone without human guidance, and the shot, grinding or buffing compound is fed into it automatically, without work-o'-hand. Moreover, there are other machines and tools used in Rock of Ages plants that rival in versatility that most marvellous of all "machines" or tools—the human hand!

But in any case, when a granite surface large or small, convex, concave, or in any other shape has been polished by Jenny Linds large or small, or by skilled hand or other tool, is then washed with water and stood up before you, you can see your reflection in it as in a mirror.

VIII

THERE are three other surfaces given Rock of Ages granite — sometimes given to different parts of the same piece of stone—in addition to the polished surface.

In some cases, for artistic as well as practical purposes such as preventing a lawn-mower from damaging the base of a memorial, granite is given a "rock," or natural, finish—a finish easily achieved with hammer and pointed chisel.

In other cases a steeled or "axed" finish is desired, to provide a pleasing contrast to a rock or to a polished finish, which has, in the case of Rock of Ages granite, a slight suggestion of blue whereas the steeled or axed finish, slightly roughened, is more definitely gray. This steeled or axed finish was first achieved by some devoted craftsman of long ago who tapped stone gently with a single blade, like that of a hatchet or ax, or, perhaps, used a sharp rock. Later on, some other ingenious workmen went further and combined several such sharp edges in what is called a "bush hammer." Now as many as twelve such edges are combined in one tool driven by compressed air, to provide a steeled or axed finish. In addition, in recent years one company, which is now a Rock of Ages division and long has been notable for its leadership in the application of science to granite manufacturing, has perfected a wholly new technique for producing a steeled or axed finish. Known throughout the granite trade as "Memokraft" and duly registered and protected by patents, this product and process are now exclusive with the Rock of Ages Corporation and Rock of Ages granite.

Advertisement

There remains yet another technique or process, and to me the most interesting and surprising of all, used in Rock of Ages manufacturing divisions for beautifying granite.

It has come to be known in granite circles as "sand-blasting." But "sand-blasting" is an altogether inadequate term.

For, as commonly used, it refers to a process as old as the use of compressed air. We see it used in big cities, thus, usually at night, when we note a throbbing gasoline compressor in a street and, following a hose run from it upward, see a workman under a canvas shelter high up on the face of a building using a sand blast to clean and brighten the face of that building. In fact sand-blasting is used all over the industrial scene, for all manner of purposes. But sand-blasting so used is one thing; here used is something else again! For the fact is that here in these Rock of Ages manufacturing plants, whence now come the loveliest new creations in the oldest and most enduring of all materials, sand is perhaps the least significant of the cutting compounds used and the technique of applying blast to stone is an art in itself.

"Jenny Linds," large and small, and other tools—but seldom the most marvelous and versatile of all, the human hand, are used, with a variety of "shot," grinding compounds and buffing materials, to get polished Rock of Ages surfaces, flat, convex, concave and even of perfect spheres, in which you can see your picture as in a mirror. Note reflection in stone.

Stone, you see, and notably a stone as hard as granite, is brittle; isn't soft, like pure aluminum, or tough, like steel, so would always have been a challenge to the hand of the most skilled of sculptors except for the discovery of deposits as fine and uniform in texture as Barre granite. But, at that, no sculptor could, except by mere chance, even hope to achieve some of the artistic effects nowadays systematically achieved in Rock of Ages manufacturing plants. Indeed, though this may seem a large order, it is doubtful if even the loving chisel of a Benvenuto Cellini could have executed some of the delicate modelings, exquisite detail, fineness and depth of line and lettering that here is achieved for the most part mechanically. Photographs of two samples of this new handiwork are here shown on the first and last pages of this article. Striking as these are, they have inevitably suffered from reproduction. You must see *real* tokens of this new art and examine them closely to make you stare in wonderment at their perfection.

Then you would see, perhaps in coats of arms, only a few inches wide yet carved in granite, a precision and fineness of detail such as few of the finest silversmiths could achieve in a tough and more or less plastic metal. You would see a use of light and shadow that would surprise a sculptor, warm a painter's heart. You would see panels of granite so thin yet so deeply carved as to be, when held up to the light, opaque, and if you are an architect you would sense wholly new effects that might be achieved by this new use of granite, in cathedral, crypt or other windows or in mural schemes. Also you would see rose leaves and rose petals so delicately carved that the very sunlight filters through them, gives to them its luster and color!

You wonder, therefore, how skill that would be a pride to any man is applied, in Rock of Ages manufacturing plants, to achieve such effects.

So, now, let's go into a drafting-room, or studio, of new kind and purpose. Here you watch a new type of commercial artist sketching exactly in the size of carving desired, a design of his own origination or one that is sent to him. He sketches that design on a paper of peculiar texture, indicates the job or piece on the margin, sends it out to the production department in this Rock of Ages manufacturing plant.

There, against the time when he can get to work with a knife that has a blade like that of the surgeon's smallest scalpel, a workman goes to a stone, all finished save for its carvings, resting on a cart. Then, with a pot, like a warmed glue-pot, and a brush, he covers the part of that stone to be carved with either a thick-brownish, or an amber-and-transparent liquid and leaves it to dry, rather quickly.

When it is dry he goes back to it, to find that this product of the chemist's art is now precisely like a sheet of rubber adhering to the face of the stone. So now, much as a dressmaker transfers a design from a pattern to a piece of fabric, he quickly makes an imprint on this rubber-like surface of the design he plans to cut. Then, squaring away to work patiently for a short time, he takes that odd little scalpel of his, which resembles a large pencil with a sharp blade at its end, and proceeds to trim out, in this rubber-like surface, just the parts that he wishes his blast to cut.

For the rest:

After moving his stone into a chamber whose dust is removed by suction, he swings a door shut and leaning over small but electrically lighted windows constituting a kind of desk in that door, he reaches in through a curtain to take up a nozzle attached via a hose to a neighboring compressed-air tank. Next, opening his nozzle and looking up to note that the air pressure gauge registers about eighty pounds to the cubic inch, he plays a blast—a blast containing one of a choice of various ingredients—on the design he has trimmed.

Now, standing beside him, you note an odd thing:

The cutting compound used in the blast at once begins to remove the stone exposed. But it bounces away

from, and leaves undamaged, the rubber-like substance protecting the rest of the stone!

There's more, much more, to this new art of "sand-blasting" granite—much in the selection and use of varied glue and cutting compounds, in the use of alternative applications of glue and blast, in the use of patented devices to get certain exclusive Rock of Ages effects. Yet this one simple illustration is sufficient to indicate that there is in this technique no limitation to the size or shape of design to be carved. Therefore we may at once conclude that now, to the ever-changing list of mural, architectural, ornamental, and allied materials, we may, in a wholly new sense, add granite, one of the most expensive of commercial stones, one of the most beautiful, certainly the most immune to the ravages of the atmosphere or other elements.

Still this is by no means all!

Over the way, in the manufacturing plant of the Grearson & Lane Company, Inc., now one of ten varied manufacturing divisions of the Rock of Ages Corporation, you find other tokens of highly specialized skill, such as the shaping and polishing of plain and fluted columns and even of perfect spheres, the hardest of all familiar geometric shapes to achieve! Here, thanks to the improvement of machines and to inventions which remind you that adaptivity *is* genius and that New Englanders have to their credit more than half of all our important inventions, you find nearly all material finally handled as wood is handled in a lathe, i.e., between chucks. You see rough blocks of Rock of Ages granite "taken out of wind," shaped with pneumatic tools, clasped between chucks, spun against steel cutters, against carborundum wheels functioning like lathes, while continuously turning in a flow of water—turning slower, or turning faster, than the cutting edge. You see granite creations indicated on draftsmen's charts always kept handy, evolve into vases, urns, sun dials, bird baths, bowls, balusters, columns, spheres, until you think of Rodin's statue, The Hand of God, or find yourself boasting, as the wife of Hizzoner boasted when she first saw Niagara Falls, "Nature's got nothing on America!" And, finally, while you learn that here spheres have been made all the way from a few inches in diameter up to six and one-half feet by the use of mathematics, hand tools, lathes and "molds," you see shapes, as varied as those used at Belshazzer's feast, spun on stands or between chucks while being "ironed," "emeried," "buffed," or given varied finishes that will remain forever, through all the "long array of time."

IX

THE larger picture of Rock of Ages granite—this impressive material that bridges *two* eternities—suggests, inevitably, an ever-increasing use for it, now that Power, Science, Inventiveness and Capital have discovered how to wrest it skilfully from Nature, ease it down Barre Hill, fashion it into many shapes in plants under centralized technical control and standards.

These quarries, and these plants, do impossible things with it—do things that the pioneers would have said no man could *ever do.*

The pioneers had trouble enough, small though their needs were, in freeing granite from the surface and getting it down Barre Hill. But today, though drills search and throb deeper and deeper downward into her precious store, she is not nowadays so reluctant to surrender her immortal material. Indeed it's quite as if she felt more confidence than she used to feel in the ability of Man, the Ingenious One, to keep faith with her.

Likewise the pioneers had trouble in believing that any great value ever would be attached to this material.

But that was in another day!

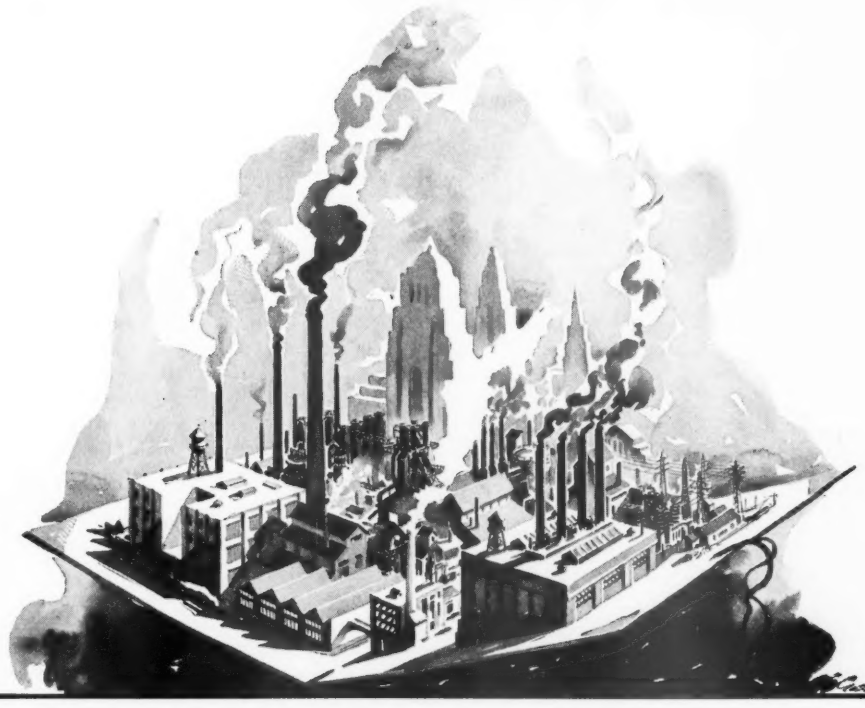
Today, you see, the Rock of Ages Corporation represents the accumulated skill of many races and of many generations. In its forbears, traditions and various new divisions as well as in its directing and executive personnel it prospers, and is prospered by, a group that has contributed richly to making Barre the Granite Center of the World. In point of technical excellencies it is unexcelled. On the merchandizing side, on the side of its provisions for the health of workers, its dependability has long since been established. And now, with enough older men to keep the young ones stepping, it is taking into its official family a new breed, in not a few cases of the third generation following its forbears, of young men technically trained to grapple with problems yet to come.

So the picture rounds out!

It began, you will remember, some millions upon millions upon millions of years ago, rambles leisurely through the busy day in which we live, looks to the future.

It began with Nature's manufacturing plant, eases through some of our own, makes one acquainted with this friendly—because dependable—material which is not merely resistant to corrosion, like some metals; is not merely resistant to Time; *is* Time, itself!

Advertisement



A PORTFOLIO OF INDUSTRIES

THE investments of Continental Shares are largely concentrated in established basic industries which are vital to the nation's industrial growth. ¶ As a substantial stockholder in these industries, Continental Shares contributes to their orderly development and to the upbuilding of the communities in which they are located.

Officers and Directors

C. S. EATON, *Chairman of the Board* — W. R. BURWELL, *President* — F. H. HOBSON, *Vice-President* — L. G. WATSON, *Secretary & Treasurer*

RICHARD INGLIS — DAVID INGALLS — R. V. MITCHELL — PHILIP WICK

Advisory Committee

F. H. BLACKBURN — JOHN S. BROOKES, JR. — H. W. FENTON — T. M. GIRDLER
G. M. HUBBARD — J. F. SCHOELLKOPF, JR. — S. D. WARRINER

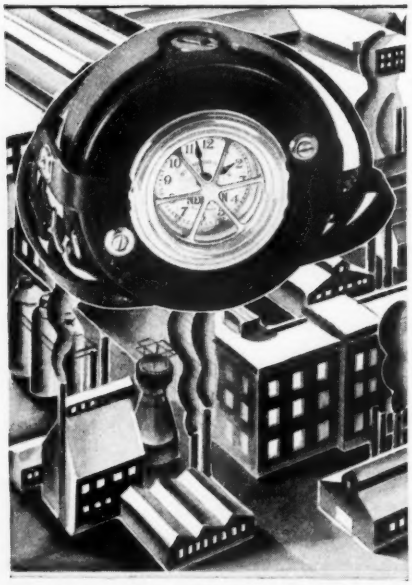
CONTINENTAL SHARES, INC.

CLEVELAND

RESOURCES OVER ONE HUNDRED AND FIFTY MILLION DOLLARS.

Common Stock Listed on the New York Stock Exchange.

DETEX



PROTECTS the PLANT

A Detex Watchclock System will keep your watchman awake and making his rounds—keep him alert to discover fires before they have had a chance to gain headway. No watchman will "take a chance" when he is carrying a Detex. He knows that the record on the dial will surely reveal his negligence if he fails to make his rounds. The savings on insurance rates when a Detex System is installed will usually pay for the system the first year.

Send the coupon for full information

DETEX WATCHCLOCK CORPORATION

4169 Ravenswood Avenue, Chicago, Ill.
39 Beach St., Boston 90 Varick St., N. Y.
Room 802, 126 Marietta St., Atlanta

Manufacturing
NEWMAN · ALERT · PATROL
ECO WATCHMAN'S CLOCKS
Approved by the Underwriters' Laboratories, Inc., and the Factory Mutuals Laboratory

DETEX WATCHCLOCK CORP.
4169 Ravenswood Ave., Chicago, Ill.

Send me information on Detex Watchman's Clocks

Name----------

Address----------

City----------State----------

DETEX

Representatives in all large cities in America and abroad

Exploring The Hidden Earth

(*Continued from Page 80*)

oceanic islands is basalt, whereas the underlying rock of the continents is of the lighter granite. This suggests that the ocean floors are of basalt, and recent observations made in submarines with gravity pendulums confirm this.

"The scars probably remained empty a long time. Gradually, as the surface cooled, the steaming atmosphere condensed into rain, and the process of filling the hollows with water began. Some of this rain fell on the continental areas, and as the water trickled down the slopes into the sea it carried particles of the granite surface. Thus began the erosion of the continents—a process that has been in continuous operation ever since."

And yet we are still well above sea level and have mountains nearly three miles high. Why?

"The reason," answered Dr. Bowie, "is found in the operation of the principle of isostasy, which means equal distribution of weight in the earth's crust. While the weather is wearing away the mountains, the rivers are overloading the sea beds with this eroded material, and the sea beds sag and settle into the heavy basalt below.

"And though this underlying rock is more rigid than steel, it flows under continued pressure, as steel will—flows horizontally to the section of crust underneath the eroded mountain and then flows upward, lifting and floating the mountain to a height which reestablishes equilibrium.

"But it does not raise the mountain quite to the original height, because basalt is heavier than the surface rock. We estimate that the difference in volume is about ten per cent. Thus if a mountain loses a thousand feet of its elevation by erosion, nine hundred feet will be restored by the flow of material from below.

"Other forces are at work, meanwhile. These deposits of sediments, which gradually harden into stone, encounter higher temperatures as they are forced down by weight into the hotter regions below. Gradually the sunken sedimentary rock and the sunken crust beneath it are increased in temperature, and slowly the rock expands, as all material does under heating. The normal expansion is supplemented by that caused by physical or chemical processes affected by the heating, and so there is tremendous turmoil, a vast pushing in every direction, as the crowded material seeks space. But there is only one direction in which it can expand—upward. It lifts, thrusting up its strata, and a new mountain range is born.

"At the same time a reversal of this process goes on in the stump of the old eroded mountain range. Its material has come from the hotter zones below, and as it rises to areas from two to three hundred degrees cooler the material contracts. Eventually there is a depression. Thus, as the new mountain range lifts from the hardened sediment of old sea beds, a sink for a new sea bed is created from the stump of the old mountain range.

"Every existing mountain range shows in its rocks that it was once a sea bed and a place of deposit for sediment. Some of our present mountains betray old age. The Appalachians are older, we believe, than the Rockies, and the Coast Range in California is still in its eager youth. These young growing mountains are responsible for earthquakes and other land movements in California.

"In the process of uplift, there must be considerable breakage and crushing of material, resistance from the neutral crust to the sides of the sedimentary rock, and irregular lifting. It is probable that after one area of the sediment has been raised a certain amount, the weight of the uplifted mass would be so great that the movement would be inclined, in some cases horizontal. Such movements, we believe, are responsible for the overthrust of Chief Mountain in Montana and others of the Lewis Range, which show an eastward movement of several miles."

The process stretches back into the dim geological ages, and it is also going on now. Every earthquake is a slip of the outer crust under the strain of disturbed equilibrium. And the seismologists tell us there is an earthquake, on the average, every hour.

The disturbance which shook Montana in 1925 was apparently an erosion quake, caused by the pushing up of the subcrust to restore the balance of eroded mountains. Similarly, the severe quake in the bed of the Atlantic ocean in 1929, which sent a destructive tidal wave over the Newfoundland coast and snapped most of the transatlantic cables, was undoubtedly the result of a sedimentary overload on the sea bottom.

And so it is with most of the so-called mysterious movements of the land surface. They are natural adjustments to overloads or underloads. These movements may sometimes bring near the surface heated areas, providing such spectacular wonders as the Yellowstone geysers. They may awake old volcanoes. But most of the crustal movement is slow and imperceptible, a gradual creep to which the rocks conform without cracking.

"Of one thing we may be sure," cautioned Dr. Bowie with a smile, as the interview came to a close. "We'll have earthquakes as long as we have rain; for the solid earth is also a balanced earth and apparently means to keep so."

The Great Imitator

Mankind's most dangerous enemy is syphilis. It takes the form of many diseases, masking as rheumatism, arthritis, physical exhaustion or nervous breakdown. It may seem to be a form of skin, eye, heart, lung, throat or kidney trouble.

Most tragic of all, it often attacks the brain and spinal cord. It may result in blindness, deafness, locomotor ataxia, paralysis and insanity—a life-long tragedy. No wonder it is called "The Great Imitator".

In certain general hospitals, as high as 30% of all patients were found to be suffering directly or indirectly from this disease. Yet many of its victims had not known what was robbing them of health and strength until a medical examination, including blood and spinal fluid tests, revealed their condition.

Syphilis can usually be cured by competent physicians if detected in time and if the patient *faithfully and persistently follows the complete treatment prescribed by his doctor.* If the early stages are neglected, cures are less certain, but a great deal can still be done to relieve suffering.

It is estimated that about thirteen million persons—one out of ten—in the United States and Canada have or at some time have had syphilis. Because of fear and ignorance, millions of victims have been imposed upon by quacks, charlatans and blackmailers pretending to practice medicine.

A most effective way to reduce the amount of syphilis is the pre-natal treatment of mothers suffering from this destructive disease.

Parents and teachers owe it to those dependent on them for education and guidance to replace secrecy by knowledge, frank instruction and friendly advice. Physicians, health departments, and social hygiene societies willingly offer their aid.

The Metropolitan Life Insurance Company will gladly mail, free, its booklet, "The Great Imitator". You are urged to send for it. Ask for Booklet 730-Z.

NOTE: The Metropolitan first published "The Great Imitator" in January, 1928. Since then, leaders of public health organizations and directors of big business have requested that it be republished and that booklets be provided for wide distribution. The booklets are ready.

METROPOLITAN LIFE INSURANCE COMPANY

FREDERICK H. ECKER, PRESIDENT — ONE MADISON AVE., NEW YORK, N. Y.

. a free service *for our Readers*

●

BUSINESS ORGANIZATION BUREAU *of* World's Work

E. R. Singer, *Director*

●

WORLD'S WORK readers will find the advertising pages both interesting and useful. As an additional feature the Business Organization Bureau invites requests for information and suggestions helpful in the solution of the many administrative problems continuously facing to-day's executive, and will arrange to have our readers supplied with literature dealing with their particular case. No charge is made for this service.

Kindly inform us ON YOUR BUSINESS LETTERHEAD as to the particular problem you are interested in, and mail to E. R. Singer, Director, Business Organization Bureau of WORLD'S WORK, 244 Madison Avenue, New York City.

FINANCE AND OFFICE MANAGEMENT

A. Equipment

Addressing
Automatic Typewriting
Check Writing
Dictating and Transcribing
Duplicating
Executive Office Suites (Period Furniture)
Fire Resistive Safes
Floor Coverings
Folding (Circulars, letters, etc.).
General Accounting
Inter-communicating Systems (Internal Telephones)
Inventories
Lighting Facilities
Mail Dispatching
Mailing Supplies
  Cartons
  Envelopes
  Tubes
Material, Stores Accounting and Inventories

Mechanical Bookkeeping Equipment
Cards
Indexes
Trays

—

Multiple Copy Writing

Office Furniture
Aluminum (Chairs)
Steel
Wood

—

Office Printing
Office Records and Filing
Office Ventilating

Papers for Office Use
Announcements
Bond Paper
Envelopes
Ledger Paper
Lightweight Stationery for Air Mail
Permanent Record Papers
Printed Forms
Safety Paper for Checks

—

Payroll and Cost Distribution
Public Utilities Accounting
Sales and Expense Analysis

Sectional and Movable Office Partitions
Steel
Wood

—

Sound Absorption
Statistical FigureWork

Steel Storage Equipment
Cabinets
Lockers
Locker Locks
Shelving

—

Tabulating
Telegraphic Typewriters
Time Recording
Traffic and Transportation Accounting
Visible Records

B. Services

Analysis of Record Keeping Problems and Indexing
Appraisal Services
Budget Control
Business Reports
Business Training Institutions
Cost Accounting Methods
Engineering —Industrial
Financing Facilities
Financial and Business Condition Services
Floor Layouts
Income Tax Reports
Industrial Wage Plans
Statistical Service

INDUSTRIAL (Production and Distribution)

Air Conditioning
Appraisals
Arc Welding
Automatic Sprinkler Systems
Brass Pipe

Building Materials and Products
Brick
Bronze
Cement
Fibre Products
Limestone
Locks and Hardware
Lumber
Marble
Skylights
Steel
Steel Windows
Tiling
Vitreous Products
Wrought Iron

—

Building Service (Designing, Engineering, Construction and Equipment)
Cast Iron Pipe
Centralized Production Control
Compressors
Condensers
Copper Pipe
Cost Reduction Engineers
Diesel Engines
Electric Fans
Electric Wires and Cables
Equipment for Power Generation and Transmission — External
Especially Designed ProductionMachines
Files
Floor Layouts
Gas Engines
Heating Equipment
Incinerators
Insulating Materials
Lighting Facilities
Machine Knives
Management Engineers (Public Utilities Operation)

Materials Handling Equipment
Conveyors
Cranes
Hoists
Trucks

—

Metal Protection on Buildings (External Coating)
Motor and Generator Designing and Building
Packaging Machinery
Physical Distribution (N. Y. Area and Abroad)
Piping Products

Plant Maintenance
Cleaning Materials
Fire Prevention and Protection Engineering and Equipment
Floor Cleaning Devices
Lubrication
Paint Sanitation
Smoke and Combustion Problems
Wire Fencing

—

Pneumatic Tubes

Power Distribution—Internal
Bearings
Belts
Chains
Power Distribution Instruments — Internal (Transformers)

—

Pressed Steel Products
Process Heating
Production Control
Pumping Machinery
Recording Instruments
Refractory Materials
Saws
Siding and Roofing Materials
Stamped Metal Parts
Steel Partitions
Steel Sheets
Steel Shelving for Stock or Storeroom
Temperature Control (Installations)
Temperature Control (Instruments)
Transportation (Motor Trucks)
Valves
Ventilating Equipment
Waterproofing
Water Softeners
Window Shades

Wrapping and Shipping Materials
Corrugated Fibre
Paper
Wood Crating

—

Wrought Iron Pipe

See *through* Business Walls

YOU can't actually watch every department of your business all day every day. But you can know exactly what each department has done each day. You can have this information on your desk at nine o'clock, in a single report that gives you a complete fact and figure picture of your business, daily.

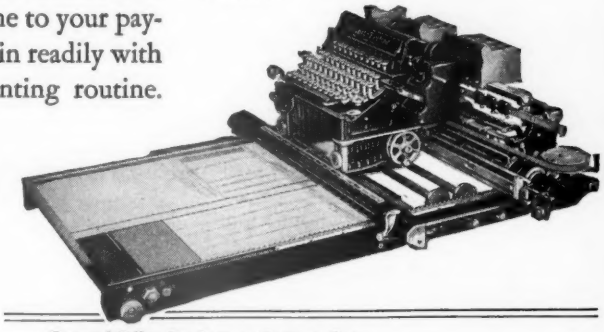
Keep posted on the status of your business

Thousands of executives have found that this is the only method which keeps them really posted on the status of their business. They have found that Elliott-Fisher enables them to make decisions based on fact. Their judgment is not made unsound by stale reports.

Elliott-Fisher keeps the ever-changing picture of orders, inventories, sales billed, bank balances, shipments, accounts receivable and payable . . . and other vital facts . . . constantly before your eyes. Nor will Elliott-Fisher necessitate adding a single name to your payroll. In fact—it fits in readily with your present accounting routine. And adds to the capacity of your present staff.

Learn about this remarkable business machine

You'll want to know how Elliott-Fisher may efficiently serve you as it is serving thousands of firms noted for their successful management. Send the coupon for more detailed information about Elliott-Fisher.



The Elliott-Fisher flat surface accounting-writing machine

Elliott-Fisher

Flat Surface Accounting-Writing Machines

Product of Underwood Elliott Fisher Company

Distributed by

GENERAL OFFICE EQUIPMENT CORPORATION

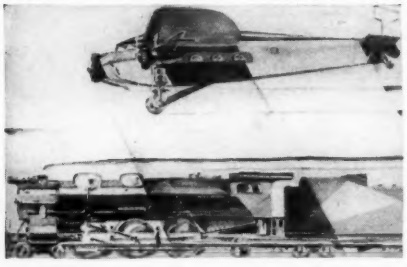
342 Madison Avenue, New York City

"Underwood, Elliott-Fisher, Sundstrand, Speed the World's Business"

General Office Equipment Corporation
342 Madison Avenue, New York City
Gentlemen: Kindly tell me how Elliott-Fisher can give me closer control of my business.

Name_____

Address_____



MODERN BUSINESS WRITES THIS PRESCRIPTION FOR THINNER PAPER

MODERN business, typified by the increasing use of air mail, export correspondence and branch office communication, literally wrote the prescription for Dexstar Manifold.

The need for strictest economy in postage was obvious. Out of that need has come the Special Dexstar Manifold No. 5—the thinnest, lightest writing paper made.

Dexstar Manifold No. 5 is one of a long line of highest grade Thin Papers, the result of nearly a century of paper making. Flat, antique surfaces insure clear, clean, legible carbon copies.

We will be glad to supply samples and further information.

DEXSTAR MANIFOLDS

C. H. DEXTER & SONS, INC.
Department C-1
WINDSOR LOCKS, * CONNECTICUT
Makers of highest grade thin papers since 1835.

Two-Legged University

(*Continued from Page 72*)

Davis, the Medical School and other colleges at San Francisco, the Scripps Oceanography Institution at La Jolla, and the rest.

"At first," said Dr. Moore to me, "this idea of the University of California at Los Angeles was the conception of one man, then of two, then of a dozen, then of twenty. And so, through disappointments and delays, it has come finally to pass."

The director of the southern leg comes to his office with no hesitation, you see, about the purposes of his institution. He had lived the future to a great degree in his imagination; his plans had been full-shaped, so that with the realization in brick and stone, everything began to function with extraordinary smoothness. A notable scholar, particularly in his field of pedagogy, Dr. Moore brought with him to California all the best traditions of Eastern university thought and life but also the knowledge of how to fit it to a new environment.

The two men who will work together to attempt a greater university than has yet been known in the western world—Dr. Sproul the president and Dr. Moore the director—represent an identity of purpose and at the same time a striking contrast. The younger man, Sproul, is frankly a business executive with a love of the classics and an insistence on scholarship; Dr. Moore is frankly a scholar with a love of pragmatism and an insistence on making learning earn its living, so to speak. Unless scholarship can put its impress on daily life and work toward the end of material benefits, it is sterile, in the judgment of Ernest Moore. He takes the stand of William James—the body must be provided for as well as the soul.

The University of California will continue to serve, primarily, its own state. That is its duty. But it is certainly destined to become the seat of learning of all lands that border on the Pacific. Its geographical position, as well as the relationships that are naturally taking form, will bring to it students from all Asia and much of South America.

Already the number of students coming from Pacific lands is large, and there is now being built upon the campus at Berkeley an International House, made possible by the generosity of John D. Rockefeller, Jr.

A thing of beauty, Spanish in architecture and equipped to give comfortable and cheerful housing to 331 men and 115 women, International House will speak the word Welcome to the thousands of students studying in the University. One fourth of the residents in this house will be "Americans," and through this fact the visiting students will be brought at once into social contact and fellowship with our people.

Sunset is the burglars' sunrise!

Your night—their day! You're out! They're in! And again you're "out," in more ways than one, unless you Ætna-ize! An Ætna Residence Burglary Policy reimburses you for all articles stolen, and pays for any damage done to premises or property by those who come to steal.

***Now* is the time to get in touch with the Ætna-izer in your community. He's a man worth knowing. Look him up! Ætna writes practically every form of Insurance and Fidelity and Surety Bonds. Ætna protection reaches from coast to coast through 20,000 agents.**

ÆTNA

Ætna is the first multiple line insurance organization in America to pay its policyholders one billion dollars.
Ætna Casualty and Surety Company
Ætna Life Insurance Company
Automobile Insurance Company
Standard Fire Insurance Company
Hartford, Connecticut

ÆTNA-IZE

The Men Who Fly

(*Continued from Page 65*)

learn whole mountain ranges as you and I know our city streets, our own back yards.

Applying these facts to commercial air transport as it stands to-day, we get some illuminating data.

Western Air Express, for example, has not had a single major accident with passengers since beginning operations between Los Angeles and Salt Lake City more than three years ago. Boeing Air Transport, with a total of more than nine million miles flown in transport operations, have lost only one pilot. Incidentally, eight out of the first ten senior mail pilots of the country are with Boeing. The Stout lines, flying between Chicago, Detroit, and Cleveland, have set up a safety tradition with somewhat younger men, having carried more than one hundred thousand air passengers without a scratch.

Still the fact remains that as air operations develop, with new lines opening up one after another, there are not enough experienced pilots to go around. Young, skillful lads, capable of rounding out in time into weather-wise air captains, yes. Old-timers, who already have acquired wisdom and experience, no.

And in the meanwhile, except for the leading lines able to secure and hold their full quota of the limited old-group pilots, the occasional air-transport crashes will continue.

Tin Fish

(*Continued from Page 57*)

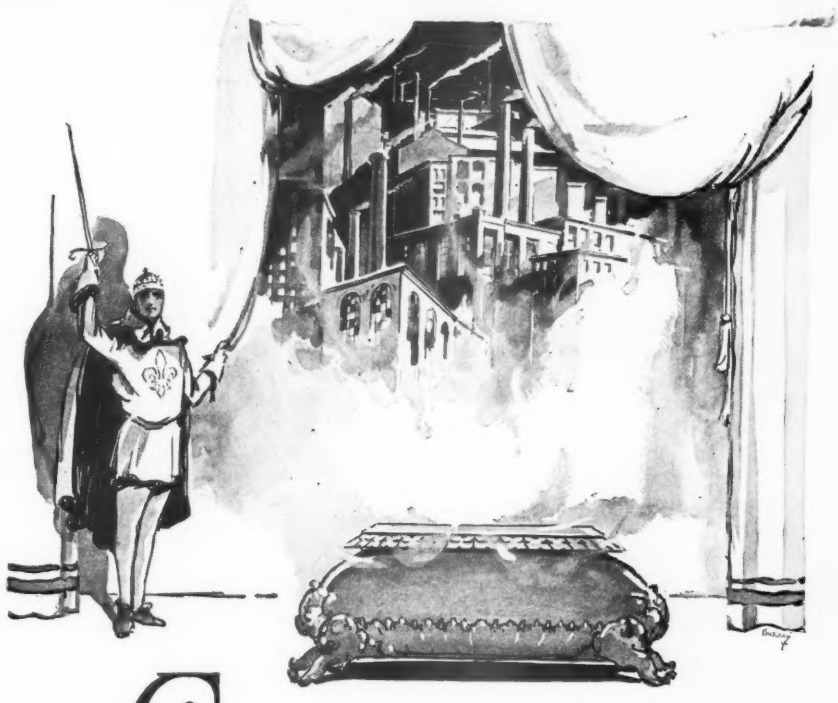
He just couldn't help himself. He went up and up, passed safely through the upper lid, cleared all the projections, and was carried to the surface in a bubble of air. "I felt no discomfort and was able to breathe the whole way," he told the crew who picked him up.

With the information he gave them, tubes were attached to the ammunition hoist of the sunken K-boat and the men inside her were given air and food until it was possible to attach wires to the boat and raise one end out of the water. Finally the crew was able to escape through one of the hatches.

Fate was kind to them; for the very moment the last man was out the wires parted, and K-13 sank once more to the bottom.

The war is a thing of the past, its horrors and its lessons already dimmed by time. Of these horrors, no weapon, save possibly gas, captured the imagination of the world as did the submarine. Some countries wish to retain its use; others are willing to abandon it.

But whatever may be their future, the value of submarines as engines of war will always be limited to the skill and courage of the crews that man them.



CHEMISTRY~
Magician
behind a Thousand Industries

Among the major forces which are transforming the world today the most amazing of all is Chemistry, the modern wonder-worker.

Beneath the sod of ten thousand virgin hills lie buried treasures rich and rare. Mere worthless rocks and stones they seem to be—yet in them Nature has concealed untold possibilities...Above them some chemist waves his magic wand...a new secret is revealed...tomorrow, another industrial miracle is born.

Even rust—that slow conflagration which eats away our steel and iron—has so, of late, been conquered... From the common black carbon that we call "Coal", chemists have wrested potent liquids which drive our engines, dye our fabrics, furnish priceless medicines, and perform an endless list of services. Even from its foulest compounds are now distilled exquisite perfumes that match the fragrance of the rose.

Marvelous indeed are such triumphs of Chemistry. As each new page unfolds, new industry is made possible ...new processes...newer and better methods for established industries. New factories are being established; new businesses created. For these, as for every manufacturing enterprise to which chemicals are important, proximity to raw materials is essential.

All the country around St. Louis is richly underlaid with minerals. Here are the world's greatest coalfields; natural gas, and oil; most of the important raw materials; a huge chemical manufacturing industry, and extraordinary commercial and manufacturing advantages. All these are worth the particular investigation of business men...An interesting booklet is available.

27 Raw Materials of the St. Louis District

Coal
Iron
Silica
Salt
Diaspore
China Clay
Lime
Fullers' Earth
Fluospar
Asphalt
Oil
Phosphate
Copper
Gas
Sulphur
Bauxite
Zinc
Lead
Tripoli
Fire Clay
Rock Clay
Barytes
Chalk
Gypsum
Granite
Manganese
Marble

WRITE DEPT. C-7.
THE INDUSTRIAL BUREAU OF THE INDUSTRIAL CLUB
ST. LOUIS

A Depression-Proof Industry

By JOHN K. BARNES

AN INVESTIGATION has been under way for some months past on the part of the Federal Trade Commission into the operations of public-utility holding companies. There also looms on the horizon the possibility of a senatorial investigation of such companies.

As yet the public has taken little interest in this matter, for the Federal Trade Commission has barked up many trees in the past and has brought down few 'coons. But if Senator Couzens' committee decides to go into the financial operations of utility holding companies at the next session of Congress, the matter may then reach the front pages of the newspapers.

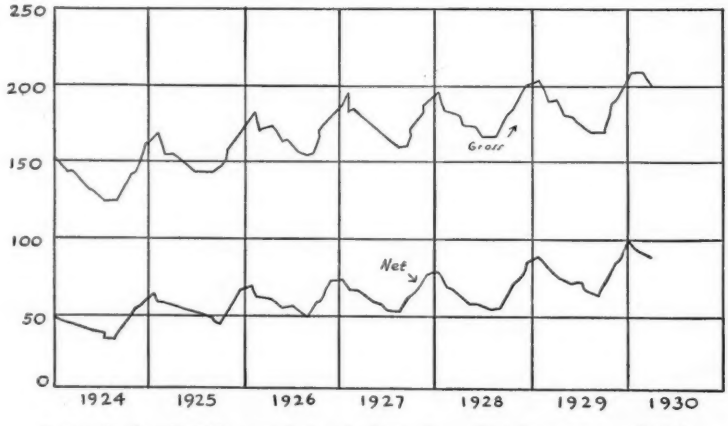
If this occurs, some investors in public-utility securities may become disturbed because of it. There is no reason why they should. The only ones who might be adversely affected are those who have bought public-utility stocks for speculation, particularly the common stocks of holding companies that have been much inflated in market value in the past two years.

The current business depression through which we are now going as a natural sequence of the rapid progress of prosperity between 1921 and the middle of last year brings out again the fundamental soundness of the electric power and light industry and its attractiveness from an investment standpoint. The following figures show how little effect the general recession in business has had on electric power production. The figures are for daily output in millions of kilowatt hours.

	1929	*1928*	*% Gain*
Jan.	265.8	234.4	13.39
Feb.	265.3	236.8	12.03
Mar.	257.7	233.6	10.31
Apr.	262.5	228.2	15.03
May	261.1	229.6	13.76
June	259.0	233.3	11.01
July	258.4	230.4	12.15
Aug.	266.4	242.3	9.94
Sept.	266.6	242.5	9.93
Oct.	280.9	255.5	9.94
Nov.	274.7	258.4	6.30
Dec.	274.7	255.2	7.64
	1930	*1929*	
Jan.	278.9	265.8	4.92
Feb.	272.3	265.3	2.63
Mar.	263.4	257.7	2.23

This showing so far is better than that made by the industry in the postwar depression of 1920-21. In those two years there was a slight drop in production of electrical energy, followed in 1922 and 1923 by a greater growth than in any previous years. Despite that drop in output, however, there has never been a year since the birth of the industry that the aggregate annual gross receipts of electric power and light companies in this country have shown a decrease. I know of no other industry that can boast of such a record.

The diagram reproduced on this page shows graphically the growth during the past six years of both the gross and net earnings of ninety-five electric companies which serve approximately 90 per cent of the population of this country. In that short period of time the net earnings of these companies have nearly doubled.



A graph showing the earnings of ninety-five electric power and light companies in millions of dollars.

The remarkable thing is that by the efficiency of their operations practically all the gain in gross is carried directly to net, a very small part of it being required for increased operating expenses. This is largely because machinery plays a major part in this industry and the cost of new machinery is a capital and not an operating expense.

The industry is constantly in need of new capital to provide facilities for its growing business. The interest it has to pay on this capital comes out of net earnings instead of gross. For that reason one should not compare the operating costs of electric companies with those of companies having large labor and material expenses without also taking into account the cost of new capital, which is one of the constant needs of an expanding electric power and light business.

Incidentally, the charges for depreciation of equipment and the appropriations from earnings for replacement are items that should be watched closely in a study of public-utility companies.

If insufficient charges are made for these purposes, a fine showing of earnings on outstanding bonds and stocks can be shown for a time, but ultimately, when the equipment wears out or should be replaced with more efficient machinery, there results a piling up of capitalization beyond the value of the property, and from then on interest has to be earned on dead horses.

It is due to improper accounting in this respect, for instance, that small independent telephone companies are constantly coming to the American Telephone & Telegraph Company to be taken over. The same thing facilitates the acquisition of other types of utility companies by larger companies which have better financial management.

The growth of large public-utility holding companies has been one of the latest romances of American business. It is this growth that the Federal Trade Commission is now looking into. It will be strange if its investigation does not disclose some financial operations that are open to question, for these operations have been carried on by human beings with little or no regulation to restrain them.

But it is under such conditions that business and financial genius works best; and as long as public-utility operating companies—which are the backbone of the holding companies and in which the public is directly interested as consumers of electric power and largely interested as investors—are regulated by state commissions the discovery of a few questionable operations on the part of holding-company managers would not seem sufficient reason for taking away from the entire group their present freedom of operations.

Under this freedom from regulation a large percentage of the public-utility operating companies of the country have now been combined under holding-company management, with a resulting gain in efficiency of operations and a strengthening of their financial standing.

(*Continued on Page 102*)

An investor in Railroad Securities

IN 1929 there were transported by the railroads of the United States 2,427,000,000 tons of revenue freight and 780,000,000 passengers. A total of over $25,000,000,000 has been invested in the properties of these carriers. They employ some 1,700,000 persons who receive yearly wages of nearly three billion dollars.

Since 1916 American railroads have increased their gross earnings 75%, their capital only 13% and their outstanding common stocks only 4%. They have expended billions of dollars from earnings and capital to increase property accounts and operating efficiency.

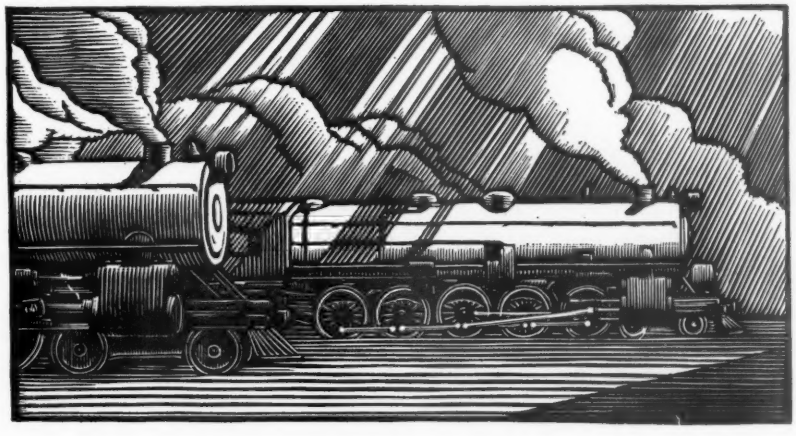
United Founders Corporation and subsidiaries own diversified railroad securities, representing substantial investments but no control of properties. At present these investments are in railways of leading American systems operating over 60% of the Class I mileage in the United States.

With its railroad holdings, United Founders combines investments in other basic fields. It has important investments in leading systems in the electric power and light industry in addition to its interests in investment companies, banks and insurance companies.

Through control of American Founders Corporation, United Founders is interested in a group of investment companies which have operated successfully over a number of years. This interest provides United Founders also with extensive economic, analytical and research service.

The operations of United Founders Corporation are directed to obtain the cumulative and substantial results which accrue from long-pull, managed investing.

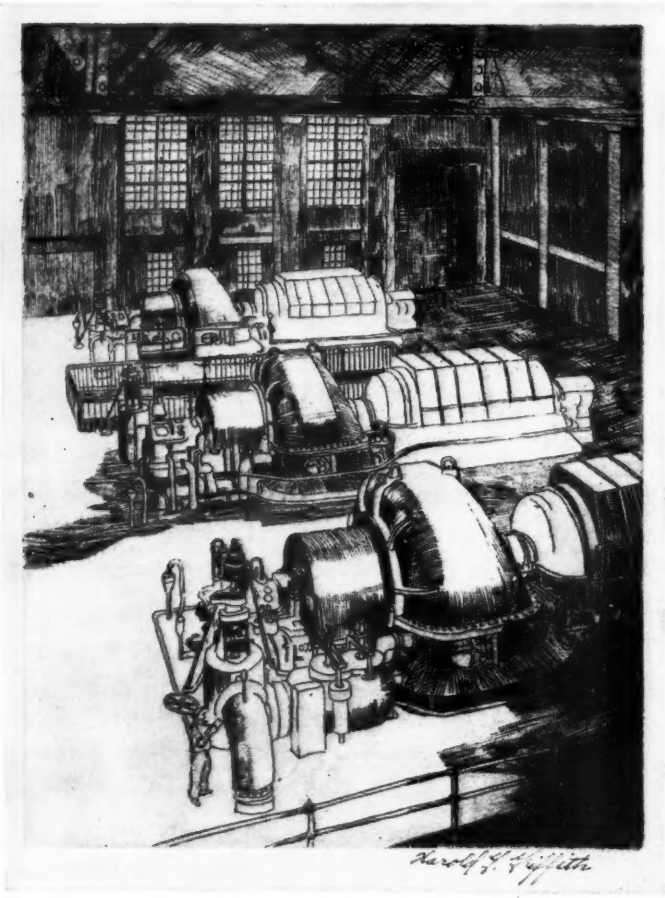
DECORATIONS BY ROCKWELL KENT - CUT IN WOOD BY J. J. LANKES



UNITED FOUNDERS CORPORATION

This advertisement is the third of a series outlining the investment activities of United Founders Corporation

IF YOU WANT CHEAPER POWER



POWER costs at Cleveland give local industries a distinct advantage over competitors in other cities. Three factors contribute to this result; proximity to coal fields; an unlimited supply of cold, clear water, and modern pulverized fuel plants, recognized as models the world over.

¶ Manufacturers are assured of constant and abundant power plus reliable service at low rates. Interconnecting generating stations have a present capacity of 600,000 horse power. An additional 200,000 horse power is being added this year by the building of a new plant with an ultimate capacity of 500,000 horse power.

¶ Power is one of the ten important factors in selecting a business location. For specific data regarding power at Cleveland, address this Bank.

GUARDIAN TRUST COMPANY

CLEVELAND, OHIO

©G. T. Co.

RESOURCES MORE THAN $165,000,000

(*Continued from Page 100*)

Since it has become possible within the past few years to transmit power over much greater distances, the so-called "superpower" development has started and is resulting in the still greater combinations. Thus large sections of the country may soon be served more economically than ever before.

It has been these combinations, with increased efficiency of operations and declining rates to the consumer, that has placed this country far ahead of the rest of the world in the use of electricity. As a matter of fact, we use as much if not more electric light and power than all the rest of the world combined.

Something of the vision back of this holding-company movement and of the benefits that have come from it was brought out by Mr. George N. Tidd, president of the American Gas & Electric Company, in a statement before the Federal Trade Commission. After listening for weeks to the presentation of testimony regarding his company by accountants and engineers of the Federal Trade Commission, Mr. Tidd spoke, in part, as follows:

"I have been carried back to the dark and dismal days of twenty-three years ago and heard about the formation of our company, but I have heard nothing of the vision and courage required of these pioneers to enter into this undertaking.

"The problems confronting those who were willing to enter this undertaking are apparent when one considers the action of the board of directors of another company (the American Railways Company), who shortly before refused to purchase precisely this same property of the Electric Company of America that we purchased. The minutes of the meeting of this board of directors, composed of some of the most able business men of Philadelphia, state, among other things, that the Electric Company of America's assets consisted too largely of electric light and power property and that there was not sufficient electric street-railway property owned to justify risking an investment.

"Our company commenced business approximately twenty-three years ago with a limited capital and in a business which was undeveloped and which presented a great risk to those investing their money in it. We served twenty communities and had on our lines less than 15,000 customers; while to-day, as your engineer has testified, in a territory of 30,000 square miles spread over nine states we serve over 1,300 communities and have more than 605,000 customers using our service in a territory with a population of 2,815,000. So much for the growth of the territory.

"Practically all of the generating plants were small and inadequate, many furnishing service only at night, others

(*Continued on Page 104*)

KASHGAR . . . OR NEW YORK

A thousand camels treading a narrow mountain pass, laden with precious cargoes from the mysterious hidden cities of Inner-Asia—Kabul, Samarkand, Kashgar.

Whether they arrive safely at their destination and whether the goods will bring a profitable return depend upon the skill of the caravan leaders—upon *management.*

In the process of making and selling goods in the United States, there are no sudden levies by lawless mountain tribes. Yet, there are hazards and limitations no less real. Business success in New York or Columbus depends in even larger measure upon the skill of the management.

This factor of management—the ability to gauge desires and needs—to recognize changes in conditions and to take advantage of new developments—is more difficult to measure than physical assets. It is the active force, the hidden power of the business machine. It decides the rate of speed and fixes the direction. It determines the earning record.

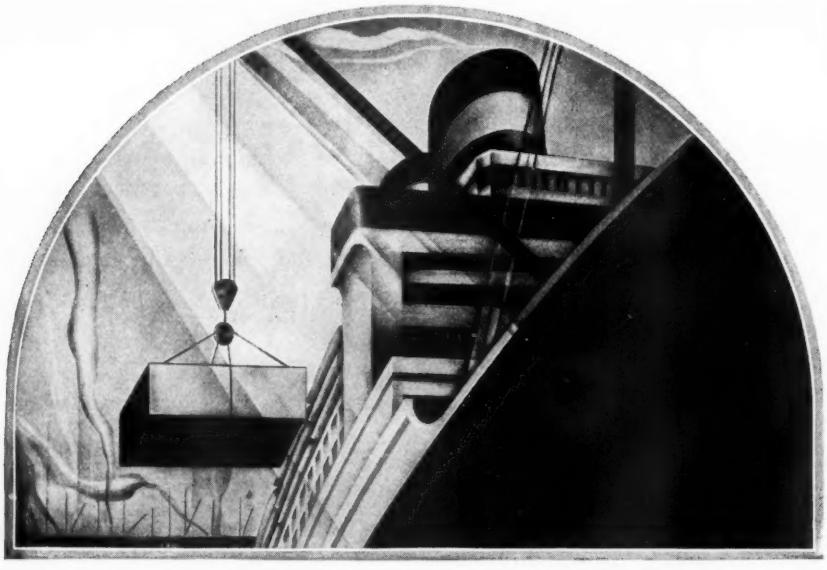
In judging investment values, the appraisal of character and management has always been our first concern. Long before the detailed statements of today were available, A. G. Becker & Co. bought many millions of corporate obligations every month and distributed them in all parts of the United States. Out of this long and intimate contact with business and management has developed a comprehensive investment service. We invite you to become better acquainted with it. We shall be glad to send you a booklet "Sound Corporate Financing." You incur no obligation in sending for it. *Ask for* CT102.

A. G. Becker & Co.

BONDS, STOCKS, COMMERCIAL PAPER

54 *Pine Street, New York*

100 *South La Salle Street, Chicago*



AMERICAN SHIPPING COMES INTO ITS OWN

Under private management, sound business administration, and pertinent legislative enactments, the United States Lines, Inc., demonstrates vividly that it can participate profitably in the vast transatlantic trade. Its eight months' record of operation of the famous transatlantic fleet, headed by the LEVIATHAN, World's Largest Ship, shows significant and satisfying gains. For instance, earnings, after deducting operating expenses, almost THREE TIMES the annual preference dividend requirements. Greater tonnages of more profitable cargoes . . . responding substantial increases in passenger traffic. And America has, in truth, just commenced to realize its potentialities as a master of ocean commerce. Why not be an active factor in our maritime growth? A part owner in this great, efficiently manned and managed all-American fleet. A shareholder in its profits, growth and accomplishments. United States Lines, Inc., Participating Preference Stock gives you the privilege.

Price at the Market

Listed on the New York Curb Exchange and Chicago Stock Exchange

Complete descriptive circular mailed upon request

P. W. CHAPMAN & CO., INC.

NEW YORK
42 Cedar Street

CHICAGO
115 West Adams Street

San Francisco
315 Montgomery Street

Los Angeles
530 West Sixth Street

Seattle
Dexter Horton Bldg.

Portland, Ore.
U. S. Nat'l Bank Bldg.

Pittsburgh
1206 Grant Bldg.

Minneapolis
509 Second Ave., S.

Portland, Maine
201 Masonic Temple Bldg.

New Orleans
Hibernia Bank Bldg.

St. Louis
Boatmen's Bank Bldg.

Grand Rapids
Grand Rapids Trust Bldg.

(*Continued from Page 102*)

furnishing service only until midnight and, therefore, giving practically no power service. The production costs of these plants were very high, many lacked railroad switches, teams were used to haul their coal and ash, many were located in congested districts and were a downright nuisance to the public generally. Hand-fired boilers aggravated the smoke nuisance. Distribution circuits, if many of them could be so called, on account of poor construction and lack of maintenance were highly dangerous. Voltage conditions were below normal, and naturally poor service resulted. Employees were paid a low rate of wage, and the rates for lighting service ranged from twelve to sixteen cents per kilowatt-hour and higher. Little use was made of household appliances, and new business promotion departments rarely existed.

"In contrast with what I have just related, I would now like to speak briefly of the conditions existing in our property to-day. Our transmission lines bind the property of our system together and interconnect it with neighboring utilities for the purpose of preservation of service in time of distress. Our service is being constantly extended in the rural communities.

"All of us know that a few years ago a farm that made use of electrical current was almost a curiosity, while to-day we have on our lines over 13,000 farm and rural customers. We consider this branch of our service so important that we have specialists in charge of it. We have prepared special rate schedules to enable the inhabitants of rural sections to avail themselves of the service.

"Our ability to give high-grade service with adequate capacity to meet all the power needs of industries desiring to locate in the smaller communities is helping to bring about the decentralizing of industry and incidentally the stabilizing of agriculture, to the immense benefit of the farmer and factory owner and his employees.

"And this trend of industry toward the smaller communities should produce a balance between town and country life which is the ideal hoped for by all who have studied the situation."

This is a brief statement, in the words of its president, of the history of one of the best managed and most successful of the public-utility holding companies. Since its success, and that of others of its kind, has back of it the good will of a majority of its customers and that good will has frequently been cemented by "customer ownership" campaigns in the sale of operating companies' preferred stocks, it is not likely that political attacks on public-utility holding companies will meet with much public favor if the people feel they may result in injury to the local operating companies.

NORTH AMERICAN TRUST SHARES

The Largest Fixed Trust*
in the United States

THE investment portfolio underlying NORTH AMERICAN TRUST SHARES is composed of shares of common stock of the following outstanding corporations, deposited with Guaranty Trust Company of New York, Trustee—

Railroads

The Atchison, Topeka & Santa Fe Railway Company
Canadian Pacific Railway Company
Illinois Central Railroad Company
Louisville & Nashville Railroad Co.
The New York Central Railroad Company
The Pennsylvania Railroad Co.
Southern Pacific Company
Union Pacific Railroad Company

Oils

Royal Dutch Company (N. Y. Shares)
Standard Oil Company of California
Standard Oil Company (New Jersey)
Standard Oil Company of New York
The Texas Corporation

Industrials

American Rad. & Stand. Sanitary Corp.
The American Tobacco Co. (Class B)
E. I. du Pont de Nemours & Company
Eastman Kodak Company of N. J.
General Electric Company
Ingersoll-Rand Company
National Biscuit Company
Otis Elevator Company
United Fruit Company
United States Steel Corporation
Westinghouse Elec. & Mfg. Co.
F. W. Woolworth Company

Utilities

American Telephone & Telegraph Co.
Consolidated Gas Co. of New York
The Western Union Telegraph Co.

A security valued today at more than the original offering price of last year—having returned 11.2% in the meantime.

Inquiries invited from Banks, Trustees, Institutions, Dealers and Investors

DISTRIBUTORS GROUP

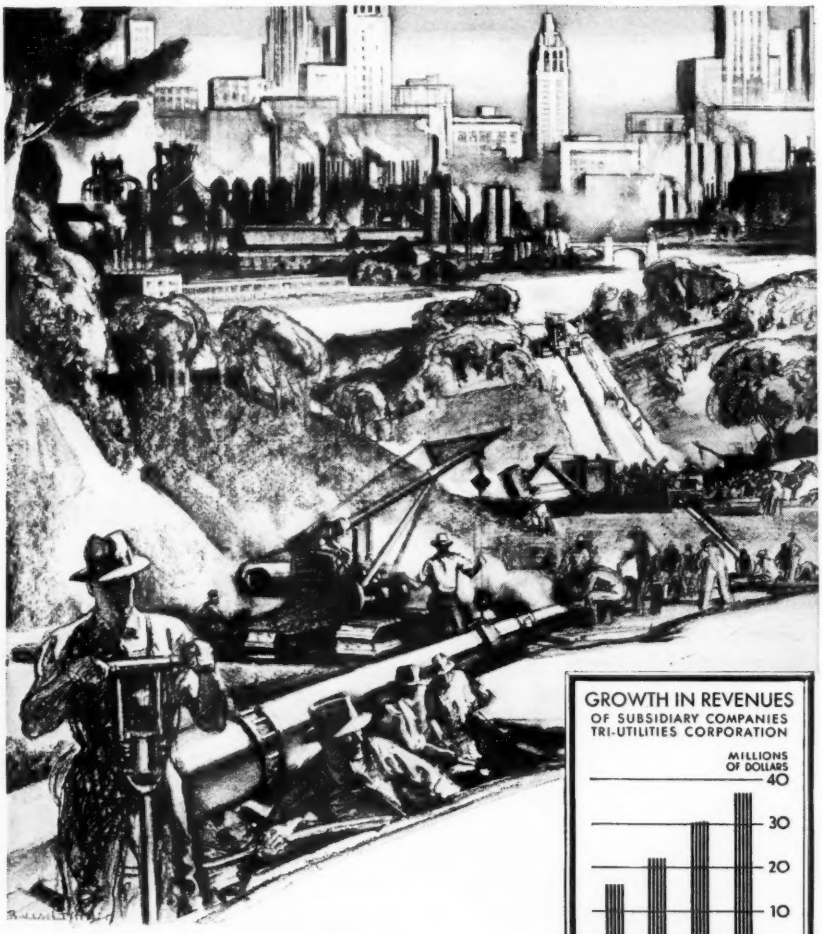
Incorporated

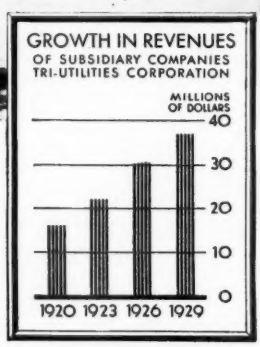
63 Wall Street, New York

Over $80,000,000 purchased by investors.

TRI-UTILITIES CORPORATION

◆ POWER ◆ ◆ GAS ◆ ◆ WATER ◆





NATURAL GAS—
for the Industrial Southeast

A great artery of steel—hundreds of miles in length and crossing three states—now links the vast natural gas resources of Louisiana with the important fuel-consuming centers of the Southeast.

● Southern Natural Gas Corporation's recently completed main pipe lines make natural gas available for the first time to Birmingham and Atlanta. This is the initial unit in a system which has for its logical market the entire Southeast.

● The system now in operation comprises nearly 900 miles of pipe line. Construction now under way is expected to increase the total to 1650 miles of lines by October of this year—reaching additional cities, and opening new markets in this rich territory.

● Investors in the securities of Tri-Utilities Corporation, which controls Southern Natural Gas Corporation, are assured of a very substantial growth in earnings as a result of this important utility development. Latest interesting facts sent upon request.

The above record of growth in earnings is impressive to far-seeing investors. In addition to these steadily mounting earnings, the corporation will derive substantial revenues from its ownership of controlling interest in the common stock of Southern Natural Gas Corporation—no revenues from which are included in the above chart.

TRI-UTILITIES CORPORATION

G. L. OHRSTROM & CO.
INCORPORATED
36 WALL STREET · NEW YORK CITY

UPTOWN NEW YORK: 400 MADISON AVENUE · BRANCHES IN TWENTY PRINCIPAL CITIES

Eighty Thousand Weekly

(*Continued from Page 75*)

observe the terms of their licenses relating to the use of wave lengths and power as well as hours of operation. It examines and licenses radio operators, both commercial and amateur.

There are seven other divisions—the Steamboat Inspection Service, providing for the security of passengers on steamships; the Bureau of Navigation, responsible for the administration of the laws governing merchant ships and seamen; the Bureau of Lighthouses, which maintains aids to navigation; the Coast and Geodetic Survey, which publishes navigational charts and tide and current tables; the Bureau of Fisheries, engaged in the propagation of fishes; the Patent Office, which passes on 120,000 applications for patents annually; and the Bureau of Mines, charged with conserving the nation's mineral resources and protecting miners. A notable instance of a service rendered by the Bureau was the planning of the ventilation system for the great Holland vehicular tunnel under the Hudson River between New York City and New Jersey.

Secretary Lamont sees the new home for the Department, now being erected in the Pennsylvania Avenue Triangle at a cost of $17,500,000, the first unit to be ready for occupancy a few months hence, as "the temple of a great American faith—the faith that as a business nation we hold in trust a high duty to serve the world as well as to get gain.

"This building," he says, "is to be a temple of truth, dedicated to enlarging the science as well as the practice of business. Here is to be housed one of the great fact-finding institutions of the country. Here for the first time all the various bureaus and divisions of the Department, with one exception, will be under one roof. Into this building will continue to pour facts and figures from every state and every foreign country, to be analyzed, classified, combined, and compared—in short, made useful.

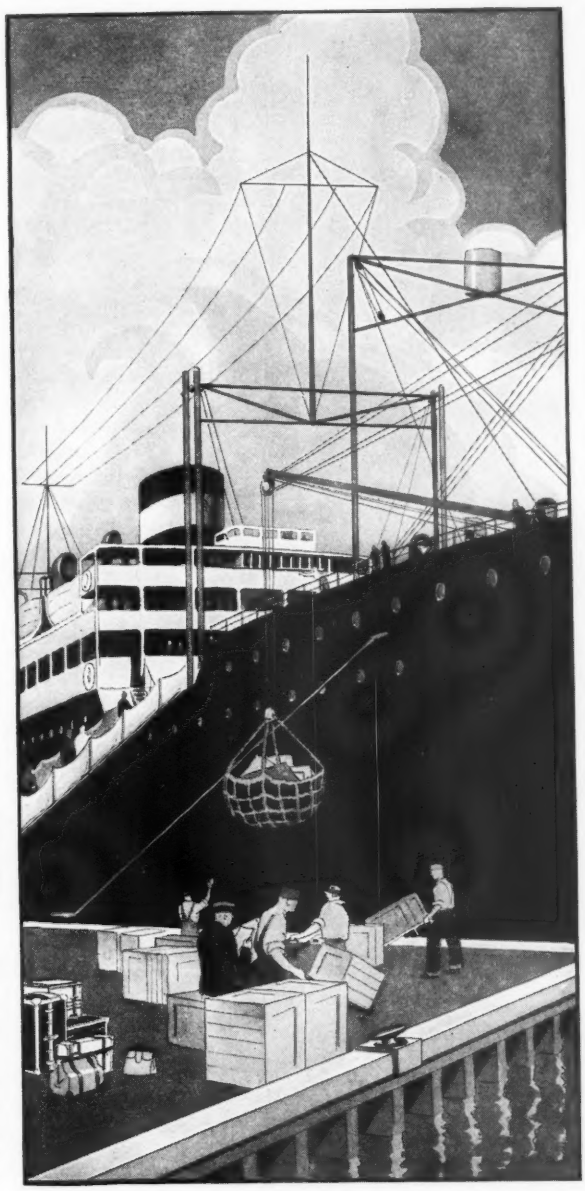
"Here will be housed an institution unique in the world, created and organized to help commerce and industry. From the beginning of history there has been close contact between business and government—but always for purposes of taxation and regulation. Here, however, is a department of the government created to 'foster, promote, and develop business.' Each bureau will contribute in its own way and in its particular field to advance American business.

"As a people, we have reacned a higher average level of living comfort than has ever before been attained in the history of the world. There is no reason why this level cannot be maintained and gradually raised.

(*Continued on Page 108*)

FROM BALTIMORE

FAST FREIGHT TO BREMEN AND HAMBURG



A BOOKLET, "Locate in Baltimore," describing the industrial and port advantages thathave attracted national concerns engaged in world trade, will be sent to you on request.

WEEKLY sailings of fast express, mail and passenger liners out of Baltimore—making Bremen in nine days and Hamburg a day later, with a call at Havre for passengers and mail—soon will augment Baltimore's port service for foreign freight shipments. ¶ Recent award by the United States Government of a mail contract from Baltimore assures this rapid movement of exports and imports. ¶ Baltimore already is one of the world's principal bulk cargo ports. The new line adds fast delivery of package freight to the port's admitted economy and efficient handling of cargoes. ¶ Closest seaport to the interior and most centrally located of all Atlantic ports, Baltimore provides forty-two overseas steamship services to over 100 foreign ports. ¶ Baltimore Trust Company finances shipments, both domestic and foreign, and cooperates with exporters and importers in expanding their foreign trade.

BALTIMORE TRUST COMPANY

MEMBER FEDERAL RESERVE SYSTEM

Underwriters and Distributors of Government, Municipal, Railroad, Public Utility and Industrial Securities

Investment and Brokerage Service

Members New York and other leading Stock Exchanges

OTIS & CO.
Established 1899

NEW YORK CLEVELAND CHICAGO

Offices in twenty-eight cities

"RELIABLE INVESTMENT COUNSEL HOW TO CHOOSE AND USE IT"

THE selection of reliable investment counsel should be the first step taken by the average man or woman planning to accumulate money. We have prepared an illustrated booklet explaining why this is true, and outlining the functions of an investment banker. It also pictures the tremendous future of the electric light and power industry—the investment field in which we have specialized since 1914. Write, without obligation, for this booklet and our list of current offerings.

Write for this booklet

R.E. WILSEY & COMPANY
Incorporated
San Francisco *Investment Securities* Los Angeles
1232 State Bank Building, Chicago

(*Continued from Page 106*)

"If, through the activities of this organization, working in coöperation with American industry and commerce, continued progress can be made in simplification, standardization, elimination of wastes in manufacturing and selling, then costs and selling prices can be further reduced and markets widened. If our great quantity-production industries, which have been keyed up to vast outputs to supply the first-hand home markets, can find constantly expanding foreign outlets to take care of surpluses as home markets gradually shift to requisites for replacement, then present employment schedules and wages can be maintained.

"Then, at last, the magic combination, discovered within the past decade, of high wages, low costs, and fair profits can go on because we are only 6 per cent of the population of the world, because we occupy only 5 per cent of its habitable area, and because slowly but surely the living standards of other peoples will tend to rise to the level of our own, thereby steadily enlarging the markets for our products for generations to come."

There is another transition which the Secretary likes to emphasize. It has to do with the relationship between government and business.

"It is not so long ago," he says, "when business men did not look to Washington for help from the government—when they were commonly thought of as 'malefactors of great wealth' and the newspaper headlines featured mostly the trust-busting activities of the government.

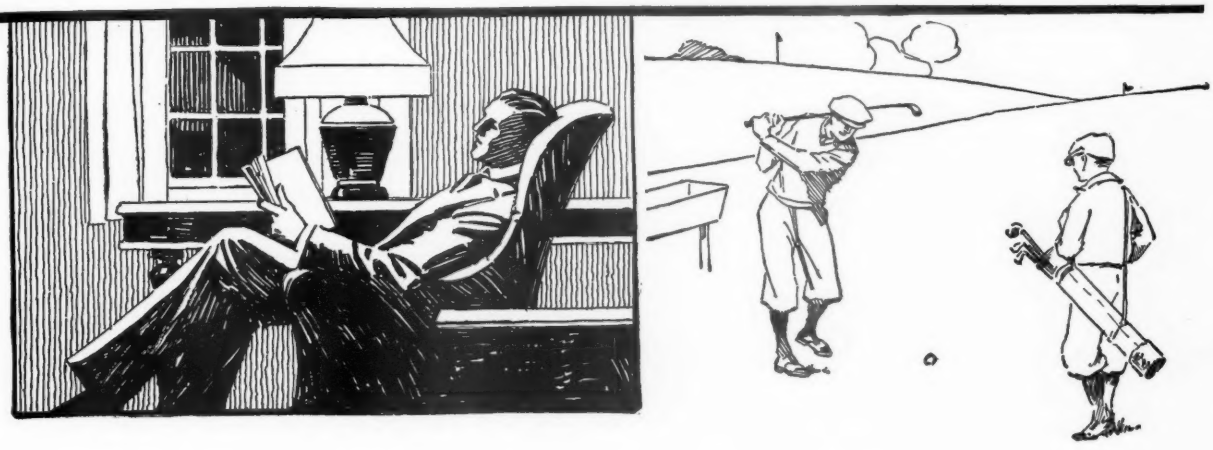
"We are living in a happier time to-day, when the relations between government and business are on a sounder, more constructive basis. The same may be said of relations between different industries and between the large forces within industry itself.

"It is not long since we heard a good deal about the conflicting interests of one section of the country and another section. For a good many years differences between capital and labor were believed to be irreconcilable.

"We no longer recognize as unsolvable the problems which arise between these groups. Their interests are not antagonistic. Labor and capital are interdependent and very largely dependent upon management. Agriculture must sell its products to the workers in industry, and the products of industry must be sold to the farmer.

"While this better relation between government and business has been to a considerable extent a matter of growth and education, it is not too much to say that its great development during the past ten years is due to the man who was the head of this Department for nearly eight years—and who is now our President."

A CENTRALIZED INVESTMENT PROGRAM



Ownership of Railway and Light Securities common stock—

Centralizes your investment program

Provides in a single transaction participation in many carefully selected enterprises of proved soundness and earning power

Relieves you of investment cares and details

Common stock listed on the Boston Stock Exchange

RAILWAY and LIGHT SECURITIES COMPANY

TWENTY-FIVE YEARS OF SUCCESSFUL OPERATION

49 FEDERAL STREET - BOSTON, MASSACHUSETTS

American Commonwealths Power Corporation

Consistent Growth

an outstanding characteristic of the gas and electric industry

is reflected in the continually increasing earnings of this rapidly expanding system of Public Utility properties.

For further information about the Corporation, its securities, and areas served, address Secretary

120 Broadway, New York

SERVING INVESTORS

¶ A service that starts with consideration of the investor's needs and then goes into the market to find securities that meet those needs has proven profitable to our clients for nineteen years.

¶ We can still serve a few more clients who wish such individual investment service.

C. M. KEYS & CO.
Established 1911
39 Broadway New York

Diversified Trustee Shares, Series C

5,000 Consecutive Dividends

FIFTY COMPANIES whose stocks are deposited behind Diversified Trustee Shares, Series C, have an average age of 25 years as regular dividend payers. In all, they have paid to date approximately 5,000 quarterly dividends without interruption.

Write today for complete information

THROCKMORTON & CO.
MEMBERS N. Y. STOCK EXCHANGE
165 BROADWAY NEW YORK
Telephone Cortlandt 6600

What Next for India?

(*Continued from Page 36*)

of investments to native rule which might destroy their value or at least diminish their returns.

In view of the above, it is possible to understand the conviction of young Indian leaders that no English cabinet, not even a socialist one headed by a pacifist, can make more than a feint at granting India self-government.

For these leaders the point of unbearable soreness is reached. They are borne out by the dictums of old John Stuart Mill, who enriched his philosophy from his long experience as an Indian administrator: "It is an inherent condition of human affairs that no intention, however sincere, of protecting the interests of others, can make it safe or salutary to tie up their hands. By their own hands only can any positive and durable improvement of their circumstances in life be worked out." And, waxing sarcastic: "The government of a people by itself has a meaning and a reality, but such a thing as *government* of one people by another does not and cannot exist. One people *can* keep another for its own use, a place to make money in, a human cattle farm for the profits of its own inhabitants."

But like an eloquent Haytian pleader before President Hoover's commission, Indians maintain that the cost in self-respect has been the more damaging. "A kind of dwarfing or stunting of the Indian race is going on under the present system," said Gokhale, forerunner of Gandhi. "We must live all the days of our life in an atmosphere of inferiority, and the tallest of us must bend in order that the exigencies of the existing system may be satisfied." The statement of his great successor's son upon entering prison was: "The moral wrong done my country by Great Britain has no parallel in history and even surpasses the material wrong."

Not only in material interests but in tastes and ideals are the English and Indian peoples in fundamental conflict. For a time Macaulay's belief that the Indians would become duly Anglicized showed a degree of fulfillment. But since Tilak and Gandhi, and largely due to justifiable Indian resentment, the Indian renascence has turned back into channels of Indian thought; and never since Clive were the two nations farther apart.

There could be no natural place in the British commonwealth for the India that is shaping to-day. Dominion status would be as artificial and forced a connection as if placed upon Russians or Turks or Italians. If really self-rule, it would be worthless to Great Britain. Nationalism in India has gone too far. The changes that must be made to save the Indian body economic and politic

(*Continued on Page 112*)

CITIES SERVICE

is one of the country's Ten Largest Industrial Enterprises

EMPIRE OIL AND REFINING COMPANY

A view of Ponca City refinery of Empire Oil and Refining Company

DIRECTLY or through affiliated companies this Cities Service subsidiary is engaged in producing, transporting, refining and marketing of petroleum products.

The principal producing properties are located in the Mid-Continent field and the four refineries, with a daily refining capacity of 20,500 barrels of crude oil, are connected with the various producing wells of the system and wells of other companies through 900 miles of oil pipe line.

Refined petroleum products are distributed through more than 540 tank and service stations located in twelve states.

WITH total assets of more than a billion dollars, the CITIES SERVICE organization takes rank as one of America's greatest industrial enterprises.

It is growing each year, because the more than 125 companies controlled, through stock ownership, by CITIES SERVICE COMPANY market products and services that are in growing demand as necessities of modern life—electric light and power, natural and manufactured gas, and petroleum.

CITIES SERVICE has been growing for 19 years—many of its constituent companies have been growing still longer—some for half a century. The consolidated gross earnings of the organization are now in excess of $185,000,000, and steadily rising.

CITIES SERVICE earnings are shared by more than 362,000 investors who are holders of CITIES SERVICE COMPANY Common stock—one of the most popular and widely distributed common stocks in the world's investment markets.

At the current market price, CITIES SERVICE Common stock yields, annually, over 6½% in stock and cash, dividends being paid monthly.

When you invest in CITIES SERVICE Common stock you become a partner in this highly successful enterprise, with a record of nineteen years of growth—and an assured future of greater usefulness.

Mail the coupon below and we will send you, without obligation on your part, an interesting booklet describing CITIES SERVICE and its investment securities.

HENRY L. DOHERTY & COMPANY

60 Wall Street ⚓ New York City

Branches in principal cities

Cities Service Radio Program—every Friday, 8 P. M., Eastern Daylight Saving Time—N. B. C. Coast-to-Coast and Canadian network—WEAF and 32 Associated Stations.

HENRY L. DOHERTY & COMPANY
60 Wall Street, New York City

Send copy of booklet describing the Cities Service organization and the investment possibilities of its securities.

*Name*_____

*Address*_____

*City*_____

064C-175

Many Good Securities

Are NEVER *Listed*

COUNTLESS investment issues find their way into the strong boxes of shrewd investors, which are not listed but have excellent markets, such as bank and insurance stocks and the securities of many sound and long established American business enterprises.

In our Investment Department, experienced traders are available at all of our nine offices, who are in daily touch with the leading "counter" markets of the country and who, with the aid of our private wire system, will obtain for you, QUICKLY, the correct market for your unlisted stocks or bonds.

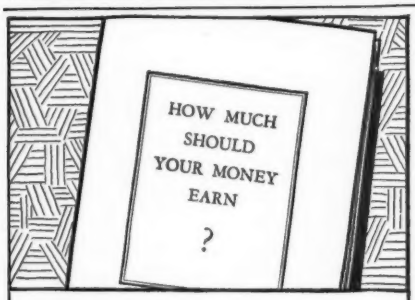
Prompt personal attention to orders or requests for market prices on unlisted securities will be given if you will telephone or telegraph our Investment Department at the nearest office

HORNBLOWER & WEEKS

ESTABLISHED 1888

BOSTON NEW YORK CHICAGO CLEVELAND
DETROIT PROVIDENCE PORTLAND, ME. PITTSBURGH

Members of the New York, Boston, Chicago, Cleveland, Pittsburgh, and Detroit Stock Exchanges and the New York Curb Exchange.



A question now uppermost!

..Very few direct answers to this question are to be found. Yet, it is one every investor would like answered . . . directly . . . sensibly . . . with reasons.

..We shall be glad to mail, to any investor, without any obligation, the booklet, "How Much Should Your Money Earn."

..It contains an interesting discussion of this interesting subject. Write for your copy today.

CALDWELL & COMPANY
450 Union St., Nashville, Tenn.
OFFICES IN PRINCIPAL CITIES

HARRIS, UPHAM & Co

Investment Securities

11 Wall Street
578 Madison Avenue
(at 57th Street)
NEW YORK

112 West Adams Street
CHICAGO

924 Baltimore Avenue
KANSAS CITY

Minneapolis Oklahoma City St. Paul
Rockford, Ill. Evansville, Ind.
Independence, Kan. Duluth Wichita
Bartlesville, Okla. South Bend
Charleston, W. Va. Tulsa Montreal
White Sulphur Springs, W. Va.

Cable Address "Upham" New York

(*Continued from Page 110*)

would be accepted from no alien. Gandhi is trying to introduce a new economy of suffering to that end.

India's revolt does not consist of a few assassinations in 1904 or a youthful conspiracy in 1918 or the noncoöperation movements of 1922 or the National Congress challenge of 1930 or a raid on Chittagong arsenal. All these may be mastered, but India's revolt continues, gathering in force, and the situation can never become more hopeful for those who oppose it.

India's revolt consists in the creation, during the past fifty years, of a new Indian intelligentsia of twenty million persons, in which Englishmen played the leading part; and in the rise of a movement throughout Asia equivalent to that which woke medieval Europe.

It receives new impetus every time a new graduate of London or Calcutta University analyzes his country's economics, every time a group of new Indian industrialists forms a Chamber of Commerce.

Mankind knows no power which can long thwart such a trend. "What they can never confiscate, and what after all is the thing that matters," said the Mahatma on the eve of seizure, "is the thought of the nation."

The intelligent opinion of Great Britain does not of course wish to thwart it—although there exist Englishmen in this day who "would like to go out there and kill off a few million of 'em." The terrible impasse is that England has allowed her prosperity to rest unjustly upon Indian ground until it has sent one of its main roots thereinto, which cannot now be cut off without endangering the vitality of the tree. And intelligent and humane-thinking persons find their wishes and their checkbooks in irreconcilable variance.

Meanwhile intelligent opinion in 1930 is confronted with the spectacle of a labor cabinet with a pacifist premier resorting to the same methods to suppress efforts toward national aspirations that were conventional in the days of the Bourbons, the Mutiny, the Declaration of Independence, or General Dyer: imprisonment without trial, suppression of the press, mass retaliation. Absolutism, controlled by idealists, shows no advance in technique.

Could the *Pax Britannica* merge into the era of native reconstruction an ideal worthy of twentieth-century intelligence would be attained; and Indians, out of great hope, might abandon their resentment sufficiently to allow such a program.

But that would require the Britons to abdicate prestige, release tribute, abandon advantage, risk bloodshed, risk investments—sacrifice and resignation too great to expect from human nature.